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TUMOURS NEAR THE POINT OF THE SHOULDER IN THE LEVATOR HUMERI MUSCLE.

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(*Continued from page* 410, *vol. xxii.*)

REMARKS.—WHAT IS THE CAUSE, THE NATURE, THE BEST TREATMENT OF AND FOR SUCH TUMOURS?

Anatomical Glance.—The levator humeri (*Mastoido-humeralis*) arises, as every one knows, by aponeurosis from the mastoid ridge, by tendon from the wing of atlas; becomes fleshy, gets attached to second, third, and fourth cervical vertebræ; proceeds down the lower side of the neck as a rather broad, flat muscle; spreads over the point of the shoulder; becomes inserted into the ridge on the outer part of the humerus, and by a slip to the front of the bone almost to the external condyle; partly covers the flexor brachii (*Biceps*) in front; contacts the anterior superficial pectoral muscle (*Pectoralis anticus*), and has an intimate connection with the faschia of the arm and fore arm. Its action is to pull forward and slightly rotate the leg. Acting together, the muscles extend and fix the head, and singly incline it to one side, slightly depressing it.

On cutting the muscle through at the point of the shoulder we find a very thin, loose aponeurotic expansion, and then the flexor brachii tendon and its bursa. Above this is the bifid extremity of the *Antea spinatus*, and to its inner side the ascending end of the anterior deep pectoral muscle (*Pectoralis parvus*). Between these muscles and the levator humeri is "the something white, not unlike the capsule of a joint" (case *j*)—viz., a loose, glistening mass of cellular tissue, in which are embedded the prescapular lymphatic glands—some adipose tissue, part of the subscapulo-hyoideus muscle, and various small blood-vessels and nerves, the principal arterial branch being, we believe, from the inferior cervical artery. To the inner

and upper side of these structures we find the jugular, the carotid, and the pneumogastric nerve. Below the point of the shoulder, running between the levator humeri and pectoralis anticus, we have also a fair-sized vein—the cephalic, on its way from the fore arm to the jugular. This cephalic vein in the case (*j*) had become varicose to an extent scarcely credible. It is no exaggeration to say that in size, two inches below the point of the shoulder, it equalled, if not exceeded, the jugular, while near it was an artery which one morning we had the misfortune to cut into, and from which the blood squirted at least five feet from the shoulder, and in a stream that would soon have proved fatal. How a "good soldering rub, with a smooth, hot firing iron," at once and permanently did away with such hæmorrhage is surprising; yet the fact remains.

The breakers ahead—of which to beware—therefore, in a deep, severe operation for the excision of tumours in the muscle and surrounding parts are the flexor brachii tendon and its bursa, the prescapular glands, with adjacent vascular and nervous branches, the jugular and carotid, and nerves, the cephalic vein, and *specially-developed nutrient* blood-vessels.

Cause.—The lower end of the scapula, with the strong, firm tendon of the flexor brachii arising from its coracoid process and passing over the trochlea of the humerus, surmounted and clothed by the antea spinatus and anterior deep pectoral muscle, is one hard body; the collar—probably an ill-fitting one—bound back by chains to a 30-cwt. load, or to a deep-set plough, is another hard body. Between them practically lies the skin, panniculus, and levator humeri. The animal is called on for sudden and severe exertion:—He extends and stretches forward his head; the levator humeri is brought at once and forcibly into action. No longer a broad, flat, flaccid muscle, it stands out prominently, flattened from above—below, a strong, round, fleshy rope from the point of shoulder up the neck, ready to tug at the leg or act on the head, fully and forcibly on the stretch. The horse gathers his hind legs under him, and with a bound throws his whole weight and all his force into the collar, and the muscles in front of the shoulders receive and feel the shock. Another horse is coming down-hill, or on the level, with an extra big load, which is swinging him about, and making him roll from side to side; and, to steady himself, he meets the swing of the shaft first with one shoulder and then with the other. Need we wonder that in such cases the force of the blow falls occasionally with damaging effect on one of the levator humeri muscles? Is it not surprising, and not a little to the credit of our collar-makers, that such injuries so rarely occur? Accidental injury, too, as in (*b*), is an occasional cause.

Nature.—As when the finger is crushed between two hard sub-

stances,—or, more properly speaking, when a muscle of the arm or leg suddenly receives a severe kick or blow,—up starts a livid bruise, hard, swollen, and painful;—injury, or stretching, or rupture of the fibres, going on, it may be, as in the cases before us, by repetition and continuation of the injury, to extravasation of blood and serum, inflammation, exudation, hepatization, enchondroma, softening, formation of abscesses and sinuses; or death, it may be, of a small part of the muscle and its encasement in strong, fibro-cartilaginous walls.

As is the injury and its duration and repetition, so is the case.

(*a*) An old chronic tumour—fibro-cartilaginous, without inflammatory action; the abscess, if any, in its centre is small, and has long ago been soothed to sleep, and its slumbers are as well undisturbed. The "let alone" treatment is not the worst in such a case. The injury to the carotid in good hands does not, and should not, occur; in the very best of hands it *may* occur, and should always be guarded against.

(*b*) Is a severe injury, but no repetition is allowed. Mild measures and time bring about resolution.

(*c*) A milder form, but the horse is kept at work for a week; the outer part of the muscle only is involved. Blistering resolves the tumour into an abscess; free incision does away with it.

(*a*) Is a type of which we have seen two or three instances, and which may, without due care, be overlooked. An abscess forms behind the muscle in the region of the glands; another, and generally the larger one, is in its outer part, while through the muscle itself is a small hole or passage of communication. The enlarging of this passage and free drainage have easily disposed of the cases we have met with. But for this the abscesses would probably have but partially emptied themselves, have become encysted, the irritation would have been kept up, and ugly tumours requiring setoning or cutting out have been the result.

(*e*) A bad, difficult case. The reason why only partial success followed the operation appears simply to be that of the case (*i*)—the excision, though skilfully performed, "was not deep, not thorough enough." Some tumours require simply to be well cut into, and laid open, and exit given to the little pus or tissue *débris;* others, like this one, require to be thoroughly eradicated, and almost every vestige of them cut out, or they "will grow again."

(*f*) Is the only case of the kind we have seen, though the horse (*h*) approached it somewhat. A biggish abscess existed behind the muscle in the region of the prescapular glands, very deeply seated in the direction of the large blood-vessels, while the muscle itself was heaved up into a hard, large, fleshy, almost fibro-cartilaginous

mass, but with no abscess in it. In the case of a very valuable horse, where blemishing is to be eschewed, setoning would be the proper course; but for an ordinary cart-horse, and a speedy good cure, commend me to the "fistulous withers treatment"—"lay the gristly mass open from top to bottom."

(*g*) A tumour on each side of the neck. For the larger—in which, apparently, there was no abscess—blistering was sufficient, causing absorption. In the smaller one the seton needle evidently reached the abscess, with good results. The properly-fitting collar, after treatment, should never be forgotten. It is not enough *to do away* with such tumours—they must afterward be ***kept away.***

(*h*) Two tumours in the same muscle—rather uncommon. Evidently the result of long-continued injury. A tumour forms pretty high up the neck. The horse is kept working; the muscle below takes on the diseased action, and another tumour forms below the point of the shoulder. Circumstances determine the treatment of such a case. A speedy and good cure by setoning and cutting out is questionable, from the length of time, and the extent to which the substance of the muscle is involved. Failing success, the horse can be "taken care of." With a right collar he may be useful enough.

On the severe cases (*i*) and (*j*) we need not further enter. That these tumours were fibrous, partly enchondromatous, in nature, and almost malignant in action, and not the products of Lymphadenoma or Cancer, can scarcely, we think, be questioned. Both subjects had been affected for months; more than sufficient time had elapsed for the production of constitutional effects, yet both horses were in good health and fair condition, and in the only *post-mortem* examination we had the opportunity of making, the internal organs were healthy, showing no sign of Cancer, Lymphadenoma or such-like disease. Cut, carve, and sear too, as we were forced to do, an apparently healthy discharge in a few days could always be depended on, and but for the persistently increasing and enlarging Farcy-bud-like formations around the circumference of the tumour, with their, at times, clear, glairy discharge, one might have doubted the presence of malignant action.

Whether the tumour (*j*) was or was not a malignant tumour, we do not presume, of course, to say. It is possible that if submitted to the microscope its substance might have been pronounced non-malignant. The mass might have failed, in some respects, to come up to the standard, rightly or wrongly, set down in books as the characteristics of a malignant growth. But its effects, at least, were malignant enough. In February the tumour was small and insignificant. In March it began to grow almost before being interfered with; it rapidly spread and enlarged in spite of all pre-

ventative measures, and in four months had destroyed the lower part of the levator humeri, invaded the pectoral and other muscles, was rapidly spreading between the legs, and if a little more time had been allowed, even the most sceptical, we think, would have admitted its practically malignant properties.

The aspect of the question, however, which,—though a digression,—has interested us most is this: Here are ten cases of tumour in the levator humeri muscle, arising from the same cause, almost at the same spot; six—(*a*), (*b*), (*c*), (*e*), (*f*), (*g*)—simple, innocent tumours, two—(*d*), (*h*)—showing slightly inveterate symptoms, and two—(*i*), (*j*)—almost, if not in reality, malignant tumours. The latter subjects, as we have already said, were fairly good, well-made, but coarsely-bred horses, having something, evidently, in their constitution very favourable to the formation of fibrous and fibro-cartilaginous growths. Now the question arises, Will a tumour usually considered simple and innocent remain simple and innocent in most horses, and in a few others, from some inherent or extraneous cause, degenerate into malignancy? And a step further brings us to the disputed and oft-discussed question, Will a simple, innocent disease remain simple and innocent in the great majority of instances, and yet, at times, and at rare intervals, develop, from some intrinsic or extrinsic circumstances and properties, into a malignant, or, it may be, an infectious and contagious disorder? "Yes," say some; "Emphatically no," say others. "Infectious and contagious diseases arise from seeds, and from seeds alone. They are like trees and plants—there is no spontaneous development in our day, and the reason why will be known when we know how the first tree was made."

Without entering into the questions:—Whether there was one beech-tree created at first, or half-a-dozen?—the tree first and then the nuts, or the nut and then the tree?—Whether we know contagious diseases as we know trees—their origin, descent, and mode of growth and propagation?—Whether, in the early ages, it was possible and natural for a contagious disease to spring spontaneously—from the force of circumstances and the constitution of animals—into being; whether, in mediæval times, this tendency continued; and whether, now in our day, it is most unnatural and utterly impossible for such a thing to occur?—Whether, as trees and plants occasionally "sport" and become hybridised; simple, innocent diseases may not, from some "hybridising agents" in the blood or otherwise, occasionally "sport" into malignancy, or even contagion and infection?—Without entering into these and such-like questions, we think it will be better, in the present state of our knowledge, not to dogmatise, but to approach the line of demarcation between malignant and non-malignant tumours, and con-

tagious and non-contagious disease, with tolerance and mutual forbearance. Safer to err on the safe side. When a pig with doubtful skin, lung, and bowel symptoms turns up, or a cow with a very questionable lung—rare occasional cases which challenge the skill of even the most experienced to determine whether Swine-fever, or, it may be Pleuro-pneumonia Epiz. is really present—it will not, we think, do a very great deal of harm to give compensation and draw the line round the premises for thirty or fifty-six days. When treating Influenza, or low, debilitating diseases, in damp, dull stables, with defective sanitary and dietary arrangements, an outlook for Farcy and Glanders may be useful—in fact, is absolutely necessary and advisable; and the practitioner, after treating successfully a dozen cases of innocent tumour in the levator humeri, may do well to pass his hand among the hairs of the mane and heels, lest in the thirteenth case, from some constitutional cause, the "innocency" departs, and the little, soft tumour of March becomes the big, practically malignant mass of October.

Treatment.—To blister the day after injury would be foolish, but to foment after all hope of resolution is gone is, so far as I can judge, no better. It is simply soothing the imprisoned pus to sleep, a sleep from which only the seton or knife can rouse it. Get resolution if possible, failing that, rouse up the tumour into an abscess—the bigger the better—and by free incision and copious suppuration get rid of it. The comparative merits of blistering and the seton need not be discussed—both are useful. The first is more easily applied; where the one fails the other may be tried, or both in combination. To the knife *versus* the hot, smooth firing iron, we give the decided preference to the latter: with the knife we have had a good deal of hæmorrhage, with the iron little or none; and, explain it as one may, the horse seems decidedly to prefer the iron—standing, in general, much more quietly, and apparently feeling far less pain than when the cold, sharp knife is used.

When excision is the only remedy, simple division and destruction of the centre may suffice; the pus escapes, the cause is removed, the effects cease. But in other cases, as (*e*), (*h*), (*i*), and (*j*), nothing short of total eradication will effect a cure, and we confess that if called on again to treat such cases, we would feel inclined to let the centres take care of themselves, and attack at the circumference, that is, where the fibres of the muscle begin to merge in the substance of the tumour. At that part, as *post-mortem* examination of case (*j*) showed, the muscular fibres all around were atrophied and infiltrated with fatty deposit—non-vascular, comparatively—and we are of opinion that if the knife or sharp,

hot iron were applied here, and sent freely down and around at once (taking care, of course, not to wound important surrounding tissues), the process of cutting would be easier, the hæmorrhage less, and the extirpation more complete; the operation simply amounting to amputation or total separation and extraction of the diseased mass from the substance of the muscle. If the big nutrient vessels are encountered, they will not probably be met with more than once, and not, as in the centre of (*j*), by themselves or their branches half-a-dozen times. Cutting from the circumference to the centre, you cut a large blood-vessel, sear it, go deeper, and divide it again, and so on; whereas going at once all around the circumference, the main trunk may only be met with once, and few, if any, branches. It is astonishing how rapidly a smooth, hot sharp iron will cut in these cases, and the flat on one side and convex on the other shape goes round the circumference, and adapts itself to "scooping out" well.

The piecemeal or bit-by-bit treatment adopted in the case (*i*), has its advantages, and is not altogether the waste of time one might at first suppose. If you cast a horse and cut out a large tumour, a considerable wound is left, which takes about a month to heal, and if the tumour begins to grow again, the labour and time is almost lost. Whereas, with a quiet horse—and only, of course, with a quiet horse—much may be done by piecemeal in a month or six weeks. Several pieces have been removed and the parts are healing. You have made your footing secure as you go along; these parts won't grow again, and when you come to the deep *coup-de-grace*, though in fear and trembling, if you succeed your case heals rapidly and is cured. With a suitable subject the process is safe, sure, and satisfactory, and though rather slow, not, after all, above a fortnight or three weeks longer than the effects of a more brilliant, though risky, big operation.

In closing, I have to apologise for taking up so much space. It is not, however, easy to condense ten cases. I trust no one will think I have forwarded them for the purpose of airing my cases in public. They extend over a good many years. Tumours in this muscle are only now and again met with, but when they do occur some are not easy to tackle. If the cases and remarks act as dim little rushlights throwing a glimmer over the way of some young or old practitioner in the treatment of what appears to me rather a neglected subject, or serve as dim little beacons to ward him off the rocks, they will have fulfilled their desired end.

THE PATHOLOGY OF NAVICULAR DISEASE.

BY FRED SMITH, ARMY VETERINARY SURGEON.

(Continued from page 89.)

G 49 first went lame 28th March, 1881, and remained so until 29th April following. Nothing more happened until 10th March, 1882, when he again went lame of the same leg, and remained under treatment until June, when he was cast. The symptoms of the disease were well marked.

A 24 was a young horse, joined the regiment in September, 1882. Commenced to stumble badly, and came out very stiff shortly after he was received. The case did not manifest positive lameness until November, 1883. The horse was undoubtedly suffering from Navicular Disease, yet it took several months from the time the stiffness was first noticed until actual lameness was produced.

No. 100, an Artillery horse, first went lame in July, 1883, discharged relieved in August. Worked well until June, 1884, when he fell lame of the same leg again; was destroyed the following August, and acute Navicular Disease was found.

I know of another case, of which I have lost the record, where over two years elapsed from the date of the animal first going lame, until permanent Navicular Disease declared itself.

The last group I have to consider is the Navicular Disease of old age. I am not aware that this has been described before as a special result of senile decay: I have met with it so often that no doubt exists in my mind as to the truth of the statement, that *there are many old horses suffering from unsuspected Navicular Disease* the result of old age, the immediate exciting cause being the years of compression to which the navicular bone has been exposed. This Navicular Disease of old age is not always accompanied by acute lameness, but only stiffness, such as most old horses exhibit.

B 63 entered the service April, 1870, as a five-year-old, was destroyed August, 1883, for age (eighteen years) and worn out. During all his years' service this horse had never one day's sickness or lameness. I examined the navicular bursæ and found chronic disease of both.

A 35 was destroyed for an incurable sprain of the flexor tendons. This horse was fourteen years of age, and I found Chronic Navicular Disease in both fore feet.

B 19 was destroyed for age (eighteen years), and worn out. I found, on *post-mortem* examination, Chronic Navicular Disease of both feet.

A 3 was destroyed for age (nineteen years), and worn out. I

found, on dissection, Navicular Disease in both fore feet, the changes, as usual, being indicative of chronic disease.

A 13, nineteen years of age, was destroyed for being old and worn out; Chronic Navicular Disease of both feet found.

F 34, seventeen years old, *had never been lame*, was destroyed for old age. I found most extensive Navicular Disease. This case I will refer to again.

B 39, eighteen years old, was destroyed for being old and worn out. The navicular bursæ contained slight traces of disease.

F 22 was destroyed for old age (sixteen years), had done a deal of hard work during his service, and had never been lame. Before being destroyed he showed slight lameness off fore, and general stiffness. There was disease of the navicular bursæ.

F 49, destroyed as old and worn out (fifteen years), trotted comparatively sound before destruction; had only been lame once during his service, and that was some time ago. I found both navicular bursæ diseased.

The important point to observe with regard to these cases is, that with one or two exceptions, none of them were positively lame. There can be no doubt, that an old horse may have well-marked Navicular Disease, and yet give very little indication of its presence. The cause of this senile Navicular is not far to seek; it is the compression extending over a number of years to which the navicular bone is exposed.

I could adduce more cases to illustrate the various groups we have just described, but it would only be a repetition of those already given.

We have thus completed our description of the causes producing Navicular Disease; it is quite impossible to say that such and such a cause produced the disease in this bone, and that quite another one produced it in the second; there is no doubt that in many cases we have a combination of causes, the chief of which is compression.

Respecting the symptoms of this form of lameness, I have nothing to add to what the profession knows well already. I do not, however, believe in throbbing of the plantar arteries, heat in the hollow of the heel, and one or two other symptoms sometimes described. I do believe in contraction of the foot, but not in every case; I have often seen good, open, excellent feet externally, containing within them a carious bone and an eroded tendon.

The next point we have to consider, somewhat in detail, are the pathological changes which occur in the navicular bursæ, the result of disease as revealed by *post-mortem* examination. Before proceeding to this subject I should like to say a few words regarding the best method to be followed in exposing the navicular bursa

for examination; some little skill and much care is required in laying the parts open. I invariably draw the hoof in the usual manner, by heating it all round in a *slow* fire. The hoof off, I make an incision across both lateral cartilages, and through the soft tissues of the heel, keeping as close to the perforans tendon as is deemed safe; this incision I carry down to the wings of the pedal bone; these are now sawn through, and if the section is properly made there will be about an inch of the point of the frog left, and no more; with knife and forceps, the posterior surface of the perforans is cleared from the fatty frog, and the part is now ready for examination: slit up the perforatus from the heel to the fetlock, take out the perforans, and divide it at the fetlock, draw it downwards, touching with the knife its slender attachments in the pastern; everything is now exposed to the capsular ligament of the pedal joint; draw the knife across this. Next comes the superior navicular ligament; divide this very carefully at its attachment to the perforans tendon; this opens, but by no means exposes the navicular bursa; to obtain this, draw the tendon downwards, until it is tight, and divide it very carefully all around its attachment, until, by still pulling downwards, the whole surface of the navicular bone is exposed. After the hoof is off, the entire dissection does not occupy more than a minute or two, and the difference between properly and improperly exposing the navicular bursa for examination, can only be appreciated by those who are constantly examining this part.

The pathological changes we have to observe may, for simplicity of description, be divided into those affecting—1, The synovial membrane and synovia; 2, The perforans tendon; 3, The fibro-cartilaginous covering of the bone; 4, The bone itself.

Much has been written about the changes which occur in the synovial membrane of the navicular bursa. We hear of the synovial membrane being found inflamed, etc. The colour of a synovial membrane in perfect health will vary from a pale to a bright pink; it is not of a uniform colour, the tint in some places being much brighter than in others. In joints suffering from acute synovitis, the synovial membrane becomes of bright scarlet, generally all over, and is thickened and pulpy.

If we examine the changes which occur in the navicular synovial membrane under disease, we will oftentimes look in vain for the slightest trace of congestion or inflammation; at other times the membrane will appear slightly yellowish, with perhaps hæmorrhage into it at certain places, and it looks and feels pulpy. I have no hesitation whatever in saying that, as a rule, no change of any marked character will be found in the synovial membrane. The examination of a few healthy navicular synovial membranes will

convince any one who doubts my description of its usual appearance. The synovial membrane of the navicular bursa requires a little looking for; it is principally situated under the superior navicular ligament, from its origin to its insertion in the perforans tendon. Both the degree and quality of the synovia will vary; in the majority of cases the bursa is dry, or practically so; in two cases only have I found the synovia in excess; in four cases it has been of a deep yellow colour, thick and small in quantity, and in one case the synovia was reddish. These results I have obtained from the examination of fifty-two feet.

The changes in the perforans tendon are of a very important kind. I think it was Professor Dick who held that the pathology of Navicular Disease was rupture of the fibres of the perforans tendon. I will not go so far as this, as I am fully satisfied that the changes which occur in the tendon are quite secondary to those occurring in the bone. What we find in 99 per cent. of Navicular cases is a brown staining of patches on that portion of the tendon in apposition with the bone, a partial removal of the shiny peritendonum, giving the tendon a dull appearance, and erosion of the tendon to a greater or less extent. The brown staining of the tendon is not of any depth; it extends just into the tendon and no more; it is a most characteristic appearance, and I cannot call any case to mind where it has been absent. The erosion of the tendon is most singular; the part looks as if it had been scraped with a knife in an *upward* direction; sometimes it is very slight, only a few fibres presenting this appearance, but in the majority of cases it is well marked, deep large fibres being torn, the loose ends being invariably uppermost. We have a point here, in pathology, which helps to elucidate the physiology of the part. The friction between the perforans tendon and the navicular bone is not in a *downward* direction, as one might expect from the position of parts, but in an *upward* direction. If we examine the tendon in an acute state of the disease, we will find that large shreds of it are stripped up, as it were, from its centre to close to the insertion of the superior navicular ligament; sometimes these shreds are loose, at other times curled and attached to the tendon, but they are invariably turned completely up before either attachment or curling. I have seen, in a few cases, portions of the tendon also stripped downwards, but the rule is they are torn upwards; the extremities of the largest shreds are rounded, white in colour, and appear as if healed after the tearing. Of the large number of cases I have examined, I have only met with five examples where the tendon was not eroded, and these were very early cases.

The texture of the tendon undergoes considerable changes where it is eroded; the fibres are soft ***and glue-like***, and of a lighter colour

than normal tendon; the fibres are also very friable, and can easily be pulled out with the forceps. This is due to changes in the nutrition of the part, which we will describe under the head of microscopical appearances.

I have once met with a case where there had been actual hæmorrhage into the tendon from rupture of some of its small blood-vessels. The hæmorrhage was in patches and streaks.

We occasionally find that the tendon is adherent to the bone; this adhesion, so far as my experience goes, only occurs opposite to the carious or ulcerated portion of the bone; and is produced by the shreds of eroded tendon above described growing into the ulcer; it is in fact, as we shall have later to point out, only an attempt at repair and cure.

In the bone, with its investing fibro-cartilage, occurs the important changes constituting the disease. The fibro-cartilage is in nearly every case affected in one place, viz., that part covering the central ridge of the navicular, and the parts on either side of the ridge for about ¼ inch.

The changes which occur in the fibro-cartilage are:—1. Brown staining of it in patches, the interval between the patches often being healthy cartilage. 2. The deposition in the cartilage of specks of calcareous matter, sometimes only a few in number, at other times innumerable. The arrangement of these specks is singular; they are in nearly every case confined to the inferior half of the bone, sometimes extending completely across its face; occasionally so crowded together that large masses of calcareous cartilage results; or in others sparely distributed. In long-standing cases the deposits are well above the level of the cartilage, but in the majority they are embedded in the cartilage, and only show up plainly when the bone has been exposed to the air for a few hours, and the cartilage thus dried. The third pathological condition is ulceration of the cartilage; this may exhibit itself as complete destruction of the layer down to the bone; the destruction is usually circumscribed; *it may be quite unassociated with caries of the bone*, and in these cases the bone is bare, and presents several hæmorrhagic points. At other times, the cartilage indicates the process of ulceration by a villous softened condition, covered, perhaps, with small flakes of coagulated synovia. *We often find that the only change the cartilage has undergone is that of partial absorption;* it is rendered very thin, and as a result, the bone shows through with unnatural distinctness, particularly after exposure to the air for an hour or so; where this absorption occurs the part is usually of a yellowish tint, or, at any rate, presents a colour which renders it quite distinct from the remainder of the cartilage. When there is an actual hole in the cartilage and

bone, the edge of the cartilage surrounding the ulcer is sometimes loose, and may readily be removed, or raised in small flakes.

Whatever change the cartilage undergoes, it is rarely extended to the whole of its surface; the cases are very, very few where the whole posterior face of the navicular bone is affected; the changes as before stated are usually circumscribed and sharply defined, and are nearly always confined to the central part of the bone, thus affecting the ridge and the parts on either side of it.

We have described brown staining, calcareous deposits, absorption, and ulceration as the changes which may occur in the navicular fibro-cartilage. Do these changes occur singly or combined, and what is their relative frequency?

The changes may occur singly or combined; the most frequent single change is ***absorption*** of the cartilage; the next is calcareous deposit, always associated with absorption of the cartilage; *if the calcareous deposits are exceedingly numerous caries is rarely present;* when ulceration and caries are present, we rarely find any large deposition of calcareous material. Brown staining is always present when the bone is carious, exposed, or bare; is often present, though of a lighter colour, when nothing but absorption and calcareous degeneration of the cartilage exists. The relative frequency is absorption, staining, calcareous degeneration, ulceration. We may occasionally find all the above changes in one specimen; such a condition is rare; we often find staining, absorption, and calcareous degeneration associated, or staining, absorption and ulceration co-existent.

From what we have said above, it will appear that *a horse may have well-marked Navicular Disease, and yet no hole in the bone;* such is really the case. The changes in the bone are due to inflammation of its structure. This inflammation may show itself by hypertrophy, discoloration, calcareous deposits upon or caries of the bone.

Hypertrophy of the bone is rare; the part which becomes affected is the superior surface, where the superior navicular ligament is attached, and the extremities of the bone. Here we find irregular bony deposits, some of which run into and affect the superior navicular ligament, causing it to become thickened, rigid, and in parts congested.

The inflammation of the bone may show itself by the discoloration of the fibro-cartilage, the vessels shining through. If we make a section of it, it will be found of all shades, from pink to purple; the cancellated portion will ooze minute drops of blood from the torn vessels, and the structure at this part is pink or scarlet.

The compact tissue of the bone shows the most important changes in this discoloration; normally without colour, or of a

yellowish tint, it assumes under inflammation a pink, purple, or even brownish tint. The purple is certainly the most frequent change; the vessels can be seen distinctly in the compact layer much enlarged. Such are the appearances of a navicular bone on section when affected with osteitis *without ulceration*. The changes must necessarily vary, depending upon the intensity of the disease. I have seen the bone in perhaps the very earliest stage, when on section all that appeared abnormal was the unnatural depth of colour, and a purplish layer in the compact tissue close to the cancellated portion of the bone.

When the bone is affected with ulceration, then we have the usual appearances of a cavity existing of greater or less depth, often filled in with bright red granulations, which break down at the slightest touch. The edges of the ulcer are usually smooth and inverted, sharply defined, and often appear as if punched in. The size of the cavity in the bone cannot be estimated from the ulcer on its surface; we may have a small hole, which communicates with a very extensive cavity, and it may be accepted as a rule, that the destruction of bone tissue is always greater than the external ulcer would signify; the reason is obvious, the cancellated portion of the bone has much less power of resistance than the compact layers. Besides containing granulations, the ulcer often holds a little yellowish albuminous-looking fluid. The position of the ulcer is almost invariably on the central ridge, about the middle of the bone. I have seen it at the side, and have also observed it pretty high up, but these are exceptions. In shape it is usually circular; it may be irregular, from two ulcers coalescing; and I have seen just a small bridge of bone left between two ulcers. The size of an ulcer will vary from a hole which will admit a pin to that which will accommodate a pea. It is a singular fact, and one I cannot well explain, that it often happens when Navicular Disease affects both feet, that if ulceration exists it is found in both bones to occupy the same position, and to be almost of identical shape.

(*To be continued.*)

DISLOCATION OF THE SHOULDER-JOINT.

BY E. PRICE, M.R.C.V.S., BIRMINGHAM.

One day, in looking over the *Farmer's Agricultural Journal* of June 14th ult., I saw an extract from the *Field*, by "Rusticus," of an unusual accident that occurred to a steeplechase mare belonging to Mr. Whittingham, of Oswestry, which happened by her jumping short over a wide brook. It was found, after relieving her from her perilous position, that the near shoulder-joint was dislocated, and that, in consequence of the accident, she was unable to

put her foot to the ground. After her journey home, which was accomplished with very great difficulty, Mr. Williams, V.S., Llandyssil, was called in, and after examining her, he at once declared that he could succeed in replacing the joint, which he did, and restored the mare so far to health as to be fit for breeding purposes, if not for training.

Allow me to record a similar case that occurred in my practice about twenty-four years ago, to a valuable hunter and steeplechase horse, named "Beppo," belonging to the late Mr. Joseph Sankey, dealer in horses, Birmingham. When out with the North Warwick hounds, and unexpectedly coming up to a very wide brook, with a high bank on the opposite side, the ground suddenly gave way under his feet, and he was thrown violently against the opposite bank. Being unable to rise, he was examined, and found to have dislocated the near shoulder-joint. It was thought by the gentlemen in the field that the most humane thing Mr. Sankey could do was to have him destroyed at once. He was a long way from home, but before killing him he was determined to have my opinion; so he sent to Birmingham for a float, and the horse arrived about nine or ten o'clock in a very deplorable condition, being in a profuse perspiration, and, to all appearances, if not soon relieved, death would quickly put an end to his sufferings. With a great deal of care and trouble in unloading him and getting him to a suitable loose-box, I proceeded to prepare for the operation. Having had a ring and a staple driven in the wall opposite the box door, we cast him and fastened him with a surcingle to the ring in the wall, so as to make him a fixture. I put three or four flannel bandages on his arm, and a flat-headed halter on the top of them, and having placed a bale outside the door to act as a fulcrum, I attached the rein end of the halter to a rail to act as a lever, which I placed against the bale outside the door. With two good men that I could depend upon to obey my instructions, I stood at the back of the neck, with my left hand on the neck of the scapula, and with my right hand assisting to force the head of the humerus back, my assistants using gentle pressure at the lever. In about ten minutes it slipped into the cup of the scapula with a loud report. Having taken all the hobbles off, he lay quiet for a short time, his respiration falling to its natural standard, and the perspiration ceasing; he became quite dry and apparently free from pain. He turned his nose, as it were pointing to his shoulder, then neighed, and immediately after jumped up, walked to the manger, and began to feed. Of course every attention was paid to his comfort before and after the operation. After staying with him a short time, I thought it advisable to apply an extensive blister round the point of the shoulder, which had a very good

effect, and keeping the box very thin of litter so as to allow him to move the more freely. In a few days he was let loose, after which he required very little attention. He gradually recovered, and became perfectly sound, returning to work, hunting and racing for a long time after. He finally ended his days in a cab.

ON THE INTRAVENOUS INJECTION OF SULPHATE OF ESERINE IN OBSTINATE CONSTIPATION IN ANIMALS.

BY JAMES B. GRESSWELL, LOUTH.

In no branch of the veterinary art has there been such marked advance of late as in that of therapeutics, and it is highly satisfactory that in this department rapid progress is still being made almost daily. We are of opinion that in whatever degree our continental brethren may have stepped beyond us in the pathological branch of our art, the English veterinary surgeons, at any rate, have stood behind none in their therapeutic knowledge and its application to everyday practice. It is, however, not my purpose now to enter into a general disquisition on the therapeutics of veterinary medicine and surgery, but to say a few words regarding the action of sulphate of eserine on the bowels. I may first say that I have tried this drug hypodermically, as recommended by Dieckerhoff, and have invariably found it to be of little or no effect. When injected intravenously, however, the results have in each case been highly satisfactory.

On May 19th, 1886, a six-year-old strong draught horse was affected with colic, due to obstinate constipation. We were called in to see it on the 20th, and gave a six-drachm aloes ball. At 4 p.m. on the 21st, there was no relief. The pulse was 96. The pain was almost continuous. From the foreman's calculations, there had been no passage for three days. One grain of sulphate of eserine was administered by intravenous injection into the jugular vein. In eight minutes there was extreme pain. The horse broke out in twenty minutes' time into profuse perspiration. There were marked muscular tremors. At the twelfth minute after the injection, hard fæces together with fluid were passed. Violent straining continued for the next twenty minutes, during which time the animal voided no less than eight discharges of alvine material, several of the latter being quite fluid. The tenesmus and grunts were intensely extreme. Muscular tremors increased up to half an hour after the injection, after which time the animal quietened, and ate some mash, and the pulse went down to 60.

On leaving, further action was prevented by the administration of an opiate draught. The horse made a complete recovery.

We have also used this valuable salt in cattle. A cow had been

constipated for four days, and had during that period absolutely no passage. She had received full doses of Epsom salts, linseed oil, castor oil, aloes, calomel, and other aperients. Half a grain of sulphate of eserine was injected into the jugular vein, with no other result than pain manifested by frequent moanings, gurglings in the bowels, and restlessness. After an interval of half an hour, three-quarters of a grain of the salt were injected. In nine minutes the cow passed hard lumps and fluid fæces. On the following day, three-quarters of a grain were again injected with good results. The animal had two or three passages afterwards during the day, and then made a gradual but complete recovery.

We have tried it in three or four other cases, and find that unless from three-quarters to one grain is given, and that by intravenous injection, little or no action is produced. It is well to bear in mind that this drug should never be given except in very severe cases, as the action is so extremely excessive.

SOME IDEAS CONNECTED WITH THE PROGRESS OF VETERINARY SCIENCE.

BY GEORGE GRESSWELL AND J. B. GRESSWELL, LOUTH, LINCOLNSHIRE.

THE errors connected with various departments of veterinary science which are rampant in the public mind, though far less numerous and cogent than in former days, are still exceedingly productive of mischief. So much knowledge has been already gained, and so much good has been done in recent years, that one can only marvel how it is there are so many fountains of ignorance still almost untouched. Food for reflection is amply supplied by the contemplation of the past history of all science, and in the field of comparative pathology especially are we able to observe that very much earnest work, and very many active and energetic inquirers, are needed. The worst tendency in the human mind is, perhaps, that which leads men to pursue old methods, and to adhere to old ideas without attempting to advance and progress. In order to obviate such tendencies, fresh blood is continually required. New and original men must be found and encouraged. Again, much must be done to educate the great mass of the people, whose seething ignorance of the laws of science, and especially of hygiene, is appalling. This can only be done by the cultivation of the literary spirit and power. People will not read, and we cannot expect them to read, that which they cannot easily understand. Unfortunately, as a rule, scientists do not usually write so as to be comprehended easily, even by fellow-workers in their own department of inquiry. There is a good deal of what may be called scientific pomposity used in ordinary scientific literature.

The fact is, as Huxley says in one of his works, "It is far more difficult to write popularly on abstruse subjects than to write about them in the ordinary scientific language." Thus it appears that the sarcasm which is sometimes indulged in against those who write scientific books, for the purpose of meeting the requirements of those who have scarcely read deeply on scientific subjects, is very greatly misplaced. On the contrary, men ought to try rather to educate those who have had no special culture in scientific methods and pursuits. There is no doubt that very much valuable matter is lost to the world for want of those who could make it available, had they the necessary power to do so. Unfortunately, it often happens that men who know important facts will not take the trouble to record them. Let it not be imagined that we ignore the work of the past. There can be no doubt that there is a great deal of arrogance in these days which refuses to acknowledge much good work. Many men do work which is only appreciated after their death. In fact, few great men can be said, like Wagner in one field of work, and Pasteur in another, and Herbert Spencer in a third, to reach popularity even in their own time, and even such men as these only advance a little towards the zenith of their fame. The fact is that really great work requires so much labour, so much time, so much unrequited and unacknowledged effort, that it is almost impossible to reap the full rewards, the finishing touches, the end results in a man's lifetime.

With regard to enduring work in the field of comparative pathology, one thing is certain, and that is, that Veterinary science must be far more generally acknowledged as of primary and essential importance before we will be able to see how true it is that the only true science of pathology is that which rests on comparison. Comparison, the method used in all the other sciences, must *a fortiori* be used in the most difficult of all—that of pathology; and if we, in this day, wish to carry on and succeed in advancing to its great and almost infinite possibilities the new science, we must above all things grasp in their entirety the new ideas, and work them out fully and with a master's care. In order to popularise veterinary science, much must be done in trying to talk to the people about it. They must be led to acknowledge the importance of it, to see how it bears on human medicine and surgery, and is but little less complex; they must be taken kindly by the hand, and taught to see what is known about disease, and about its causation, curability, and prevention—all this must be done, and done well too, before the public will look up, as they will in the future, to the veterinary surgeon as the cultured comparative pathologist, and investigator into one of the most interesting and most essential of scientific pursuits.

And it is clear that the general practitioner of human medicine must attain some knowledge of the diseases of animals, as well as of man, before he is able to thoroughly understand morbid phenomena in general, and to make generalisations upon which a system of rational therapeutics may be based. In short, comparative pathology is the science of the future, and if the veterinary surgeons of this day work at it thoroughly and well—as, indeed, they have excellent opportunities of doing—they will have much more to teach to their brother scientists than they have yet done; and in consequence of their knowledge they will be looked up to as belonging to one of the most important of all departments of scientific research.

AN IMMENSE ABSCESS IN A COW.

BY M. G. BLANCHARD, V.S., HAMILTON, CANADA.

I SEND the following communication for publication in the Journal, hoping it may be of some interest to its readers, more from the size of the abscess mentioned than from any other point of view.

I was called to the country to see a cow, which the owner said had a lump on its side as large as my head. The history was about as follows:—He had first noticed it about three weeks ago, when the cow came in from pasture, and it was about the size of a goose's egg, but thought nothing of it. It remained about the same size for about a week, and then began to grow larger, until he called me to see it. I found the cow in good health, and she had not fallen off in her milk at all. The enlargement was situated on the left side, and filled up the space between the costal cartilages and the stifle, extending upward about five or six inches above the stifle, and down to within four inches of the median line of the belly. It protruded from the side about nine inches. There was some slight swelling along the median line of the belly, but not to any extent. It was not tender on pressure, and there was but little heat in it. It was hard, but yet elastic to the touch. At first sight it appeared as if the walls of the abdomen were ruptured, and a part of the rumen was protruding, filled with food. I introduced a hypodermic needle to find out what it contained, and on withdrawing it I found it was filled with pus. I had the curiosity to measure around the base with a string, and found it to be three feet eight inches in circumference. I opened it in the most dependent part, and pus came away, which looked very much like corn-starch pudding, of a light yellow colour and somewhat glutinous, but smelling perfectly sweet. I was unable to measure the quantity, but should judge there must have been considerably over a gallon and a half. I then washed out the sack and injected a strong solution of carbolic acid.

Editorial.

THE NATIONAL VETERINARY ASSOCIATION.

THE fourth meeting of this Association, held in Edinburgh towards the end of last July, appears to have been notably successful in several of its features, and to have attracted a fairly large attendance of members from both sides of the Tweed, though Ireland was but scantily represented, so far as numbers go. It is gratifying to observe, from the Secretary's report, that the Association is growing—slowly, it must be confessed, but none the less surely. It is to be hoped that next year's report will show a large accession of members, and give other indications of material improvement; for though it has been in existence for more than five years, yet its list of members is altogether disproportionate to that of the members in the register of the Royal College of Veterinary Surgeons.

We will not go so far as to assert that it is the duty of every member of the College to join the Association, but it is certain that if he wishes to aid in a movement which should largely contribute to the promotion of professional progress, as well as assist in the development of that fraternal feeling and scientific spirit which are not yet too conspicuous characteristics of our calling, he cannot do better than enrol himself at an early opportunity.

So long as the Association can show good reasons for its existence, and can assume the right to represent the aims and aspirations of veterinary science in its higher and most useful aspects, so long will it benefit the profession, and satisfy the public that we exist to serve and promote its interests. The reception accorded the meeting in Edinburgh was eminently gratifying, and even flattering. To the Town Council of the peerless city, our profession is deeply indebted for the signal mark of distinction with which it welcomed the Association on this, its first visit to the Scottish capital, and for the gracious reception they gave it. To the Highland and Agricultural Society of Scotland, also, must be awarded grateful recognition of generous sympathy with the efforts of the Association, in giving it the use of their fine and commodious building for the meetings. Everything, so far as these two bodies were concerned, was done to render the gathering a success, and to give it encouragement and *éclat*. Of course, the credit for obtaining such assistance and patronage, as well as for the excellent arrangements which contributed so much towards making the meeting successful, must be ascribed to the President and the local officers, who appear to have acted energetically and sagaciously in overcoming the troubles and difficulties inseparable from the organisation of such meetings. To them, as well as to the permanent Secretary, whose functions are in no wise a sinecure, great praise is due.

The experience of this meeting would point to the desirability of having a committee of members appointed, whose special business it should be to obtain, and have ready for distribution in good time, the papers intended to be discussed at the meetings. In this instance, some of the

papers were not in the hands of members until only the day before the Association met. Another, and a rather important duty of this committee should be the censorship over papers sent in for discussion, so that allusions to personalities, and insinuations conceived in a spirit of detraction or malignancy, might be expunged from them. The urgent need for this excision was well exemplified on this occasion, and nothing but harm and disgrace can result when such occurrences come before the public, while they cause serious discord in the meetings.

PASTEUR AND HIS WORK, FROM AN AGRICULTURAL AND VETERINARY POINT OF VIEW.

BY GEORGE FLEMING, LL.D., F.R.C.V.S., PRINCIPAL VETERINARY SURGEON OF THE ARMY.

(*Continued from page* 113.)

To protect the wines from these injurious organisms, Pasteur demonstrated that it was only necessary to heat them, when bottled, to a temperature of 140° Fahr. for a few moments, in a water-bath. This insures the future soundness of the wine. After having shown the causes which determine the alterations in wine, by introducing a means of practically neutralising them, Pasteur solved one of the greatest economic questions with regard to this industry. By the application of heat, and without injuring their colour or flavour, the limpidity of all wines was guaranteed, while their indefinite preservation was certain if kept in well-closed bottles, or in barrels, even if transported all over the world.

An amusing incident is related in connection with this discovery. Those most concerned in the preservation of wine were at first incredulous as to the heating process not damaging its taste, colour, or limpidness; and Pasteur addressed himself first to wine-merchants and others who were skilled in the detection of alterations in it, with a view to obtain a decisive opinion—for the public had already shown a preference for his heated wine; and at last he organised a large tasting commission, appointed by the wholesale wine-merchants of Paris. This body, at its first meeting, could not agree as to the superiority of the heated or unheated wines placed before them, many of them thinking the latter had a better flavour than the former; and Pasteur, fancying that prejudice had much to do in influencing them, intimated that at the next meeting there would be no indication as to which was the heated and the unprepared wine, but their palates should alone distinguish them. On that occasion he offered them samples taken from the same bottle, and, as might be expected, there were preferences for one and for the other, the experts not knowing they were from the same source. The Commission, alluding to this experiment, candidly confessed that the differences between the heated and non-heated wines were imperceptible, if they existed, and that the imagination was not without considerable influence in wine-tasting.

The researches of Pasteur had revealed a world of organisms, whose minuteness had hitherto either enabled them to escape observation, or to conceal their special function in the economy of nature; and the origin of these wonderful living particles, whose operations are so vast and important in their results, could not but arrest attention. Indeed, the question of spontaneous generation, upon which grave issues in pathology in particular depended, was one which Pasteur was, in a manner, compelled to take up. It was certainly one that had come down to our own day from hoary anti-

quity, but it was being debated with unusual warmth while he was successfully unravelling mysterious processes, which he traced to the action of microscopical germs, whose source might be ascribed to a spontaneous or fortuitous combination of elements. Aristotle was of opinion that all damp bodies which become dry, and dry ones which become damp, engender animal life; Virgil thought bees were produced from the putrefied intestines of a young bull; and, much nearer our own time, Van Helmont stated that the smells that rise from marshes produce frogs, leeches, slugs, etc.—nay, he had even the temerity to assert that mice could be produced by keeping a dirty shirt in the mouth of a vessel containing a little corn, which is transformed into these creatures after a number of days—he had witnessed it! and scorpions could be developed from crushed herbs placed in a hole in a brick! In the last century, Needham maintained the doctrine of spontaneous generation, but Spallanzani opposed it; Redi, an Italian naturalist, showed that maggots are not spontaneously developed in meat, but come from the eggs of flies. The introduction of the microscope was seized upon by the "Spontaneists" to support their notions, as in no way could the appearance of animalculæ in previously barren fluids be accounted for. Mistakes might have been made with regard to the origin of mice and maggots, but it could not be so in the case of microscopic living things. How, except by spontaneous generation, could the presence and rapid multiplication of these in decomposing animal or vegetable substances be explained? Buffon even lent himself to this doctrine, and devised a system in explanation of the hypothesis. In 1858, Pouchet, Director of the Museum of Natural History at Rouen, declared before the Academy of Sciences that he had succeeded in demonstrating, in an absolutely certain manner, the existence of certain microscopic living organisms which had been developed without pre-existing germs.

In a series of ingenious and ably-conducted experiments, Pasteur demolished, one after another, the arguments of Pouchet and the other heterogenists, by convincing demonstrations. "There is not one circumstance known at the present day," he exclaimed in a discourse at the Sorbonne, "which justifies the assertion that microscopic organisms come into the world without germs, or without parents like themselves. Those who maintain the contrary have been the dupes of illusions and of badly-conducted experiments, tainted with errors which they knew not how to perceive or avoid. Spontaneous generation is a chimera."

And Flourens, permanent Secretary of the Academy, hitherto neutral in the discussion, said on the same occasion: "As long as my opinion was not formed I had nothing to say; now it *is* formed, I can speak. The experiments are decisive. If spontaneous generation be a fact, what is necessary for the production of animalculæ? Air and putrescible liquids. Now Pasteur puts together air and putrescible liquids, and nothing is produced. Spontaneous generation, then, has no existence. Those who still doubt have failed to grasp the question." Subsequently, in England, Dr. Bastian became the strenuous advocate of spontaneous generation, but the crucial experiments and absolutely convincing demonstrations of Professor Tyndall, finally abolished the erroneous ideas which had prevailed for so many centuries.

As is well known, the production of silk forms the principal industry of several Departments in the South of France, and the rearing of silkworms occupies the time and attention of great numbers of people—chiefly agriculturists. Previous to 1849, this industry had been particularly flourishing; but in that year, after an exceptionally good silk-harvest, and without any appreciable cause, several of the large establishments were visited by disease among the worms, and this in the course of time assumed the proportions

of a plague among the silkworm nurseries, until at last the silk-husbandry of France was on the verge of ruin. The symptoms of the disease were numerous and variable, and sometimes the worms died early, at other times not before the first, second, or third moulting ; oftentimes the eggs were sterile. Instead of becoming white, the worms retained a rusty tint ; they did not eat ; spots appeared on their bodies like black bruises, which were scattered over the head, rings, and feet. Every batch or brood attacked perished. Fresh eggs were imported from abroad, and at first these hatched well—so much so, that the year 1853, when a large quantity of these foreign worms were reared, was estimated as one of the most productive of the century, 130,000,000 francs being derived as revenue from the cocoons. But the following year the eggs from these worms were found to be no better than the French eggs—they were also infected. To add to the misfortune, the malady extended to Spain and Italy, then to Greece and Turkey, until, in 1864, all the cultivations from every part of Europe were either diseased or suspected of being so ; and throughout the extreme East, Japan only was exempt. The plague had followed the trade in silkworm eggs, just as cattle diseases have followed the trade in cattle.

In 1865, the weight of cocoons had fallen so low, that the French revenue sustained a loss of 100,000,000 francs, and the silk-cultivating Departments were in despair. Agricultural and scientific societies, municipal bodies and governments, were all seriously engaged in attempting to discover the cause, and a remedy. And there was no lack of hypotheses, suggestions, and cures; while scores of pamphlets upon the malady were published every year, and experiments were undertaken to elucidate the mysterious scourge, and limit its ravages.

The disease was known as "pébrine," owing to the peppered appearance of the skin of diseased worms.

In 1865, in response to a petition signed by 3,600 mayors, municipal councillors, and capitalists of the severely-visited Departments, the French Government appointed a Commission to investigate the malady, and Dumas was selected as its Chairman or reporter, because of his great scientific reputation and his personal interest in one of the afflicted Departments. While preparing his report, it occurred to him that Pasteur was the man best fitted to carry out investigations as to the measures required to combat the plague. But Pasteur at first declined to undertake such a heavy task, inasmuch as his success in the enquiry into organised ferments, in their relation to the manufacture of vinegar and diseases of wines, had opened prospects of a prosperous career—in fact, it was at the moment when, disposing of the vexed question of spontaneous generation, the "infinitely little" had become to him, and to science, the "infinitely great." He saw living ferments everywhere, either as the active agents in decomposition or in producing contagious disorders. To forsake a course which he had so fruitfully pursued and made his own, with all its prospective advantages, and to enter upon another which was novel to him, and the determination of which might be the reverse of satisfactory, appeared to be too much of a sacrifice. Dumas appealed to his friendship, and his patriotism. "But consider," said Pasteur, "that I have never handled a silkworm." "So much the better," replied Dumas. "If you know nothing about the subject, you will have no other ideas than those which you will derive from your own observations."

Being at length persuaded to undertake the duty, he had to decide upon the method to be adopted in his endeavour to discharge it. For seventeen years hypotheses and observations with regard to the disease had been accumulating, and facts and opinions were only too abundant to be made available to any extent in this direction. But among the memoirs which

the calamity had called forth, one of the best was that presented to the Academy of Sciences by M. Quatrefages, and a paragraph in it had especially attracted the attention of Pasteur. This had reference to the discovery by some Italian naturalists of microscopical bodies—vibratory corpuscles—in the silkworms and moths, which Lebert affirmed could always be detected in these when diseased, and which Osimo, of Padua, had also perceived in silkworms' eggs. Another Italian, Vittadini, had even proposed the examination of the eggs by means of the microscope, in order to obtain sound ones. The mention of this in the "Memoir" in question was merely casual, being considered of doubtful importance; but it fixed Pasteur's mind on the necessity for the employment of the microscope—an instrument which had already rendered him such immense service in his experiments on ferments, that its employment again as a means of research possessed a strong fascination for him.

He started on June 6th, 1865, for Alais, where the plague raged most disastrously, determined not to return until he had mastered everything of importance connected with it. In a few hours after his arrival he had discovered, and was able to show, the corpuscles in certain worms, and after some days' examination satisfied himself that these living disease-corpuscles were numerous in the chrysalides, while there was not one of the moths but had them in profusion. In the eggs and the worms the germs existed in an imperceptible condition, and the only infallible method of procuring healthy eggs, Pasteur insisted, was by having recourse to moths free from the corpuscles. This method he had proved by experiment to be correct, but critics would not accept his statements, and he pursued his inquiry with that scrupulous care, intelligence, and pertinacity so characteristic of him, returning annually to Alais for several months during five years, to complete his work. The contagious nature of the disease—which was doubted by many, and the manner in which the contagion was conveyed—about which there existed several opinions among those who believed in its communicability, were the first points he determined. To ascertain its contagiousness, as well as the mode of infection, he took some healthy worms free from corpuscles, and fed them with diseased worms, which were pounded and smeared over the mulberry-leaves they ate; and after a certain time the corpuscles, which had already shown themselves in the walls of the intestines, began to appear in the other organs, with those red spots on the heads and the rings of the bodies, which had caused the disease to be named "Pébrine" by the peasants. Digestion in the worms was impeded because of the presence of these organisms in their intestines, and they were generally unhealthy; while those which spun their cocoons produced chrysalides which were little better than pulp. It was thus shown that the corpuscles, gaining access with the food into the intestinal canal, infested all the body in a few days; the spots on the skin were only the effect of the disease, being somewhat allied to the eruption of measles in mankind. Another lot of healthy worms fed on untainted mulberry-leaves at the same time remained perfectly free from the malady. This and similar experiments were repeated, and varied times without number, so as to prove the correctness of the conclusions at which he had arrived, and exactly accounted for what took place in the silkworm establishments. From the malady which attacked the worms at their birth, destroying a whole cultivation, down to the invisible disease that lurked in the cocoon, all was explained. But as in these establishments worms were never directly affected through food purposely soiled by diseased worms, it was asked how they became diseased. Pasteur pointed out that, in a cultivation of silkworms in which there were diseased ones, these were continually fouling the food by their excreta, which the microscope showed to be swarming with these corpuscles. This cause of natural contagion was rendered all

the more effective, because the worms, by the weight of their bodies, pressed the excreta against the leaves in crawling over them. By mixing these excretions with water, and painting mulberry-leaves with them, a single leaf off the latter enabled Pasteur to infect as many worms as he liked. Another natural and direct cause of infection was inoculation by the hooks on the feet of the worms, which, in crawling over each other, wounded their skins; and if these hooks were soiled by infected excretions, or by the corpuscles immediately beneath the skin, infection was certain. Infection at a distance through the medium of the air and the dust it carries, was an equally well-ascertained fact. It was sufficient to sweep the breeding-houses, or shake the hurdles on which the silkworms were reared, to raise the dust of dead worms and corpusculous excretions, which, falling over the hurdles of healthy worms, after a time caused the disease to appear among them. When quite healthy worms were placed in a breeding nursery at a considerable distance from unhealthy worms, they, in their turn, became infected. It was observed that in some factories healthy worms were reared in which, the year before, nearly all had perished. Pasteur explained this by showing that dust can only act as an infective matter when it is fresh; corpusculous matter loses its virulence when thoroughly dried, and a few weeks are sufficient to bring about such a result. The corpuscles contained in the eggs alone caused the transmission of the disease to future generations; and thus it was both contagious and hereditary.

Pasteur had demonstrated that moths free from corpuscles produced eggs also free from them; and also that eggs hatched at a distance from infected eggs produced healthy worms, chrysalides, and moths. It was easy, therefore, to multiply cultivations free from the disease; and, to secure the production of silkworms and silk, to guarantee that the eggs were sound, Pasteur recommended that a moth should be crushed up in a little water, which is then examined with a microscope to ascertain if any corpuscles are present.

In his investigations Pasteur soon recognised that there was another disease at work, no less destructive, though less widely spread, than the so-called *pébrine*. During his experiments, in a cultivation of, say, a hundred worms, a large number, as many sometimes as twenty, would be picked up daily; these turned black and putrefied within a few hours, being soft, flabby, and hollow; they were free from the *pébrine* spots, and no corpuscles could be found in them, while these organisms were also absent from the chrysalides and the moths of the few worms which were able to spin their cocoons. Pasteur was certain that he had to deal with a distinct disease, and that this was one known to French writers upon silkworms by the name of *flacherie*, or *morts-flats*. The cultivations most seriously affected by the malady came from eggs yielded by moths entirely free from corpuscles. Microscopical examination settled the question. If, at the period of rearing of silkworms, which happens when the mean temperature of the air is high, some mulberry-leaves are crushed with a little water in a mortar, and the liquid allowed to stand for twenty-four hours, it will be found to be teeming with microscopic organisms—some motionless, resembling little rods or spores joined like strings of beads; others flexible and moving about in a sinuous manner, like the vibrions found in nearly all decomposing organic infusions. The germs of these organisms were on the surface of the leaves before they were pounded in the water, or on the pestle and mortar. So long as the intestines of the worms were healthy, the germs were either digested or expelled without causing damage; but whenever digestion was impaired, which, with such a ravenous creature, and rapidly growing, might be frequent, then the disease appeared. "Every *ver flat* (flattened, instead of round) is one which digests badly, and, conversely, every worm which digests badly is doomed to perish of *flacherie*, or to furnish a chrysalis and a moth, the life of which, through

the injury produced by organised ferments, is not normally perfected," said Pasteur.

The vitality of the germs of *flacherie* was much greater than those of *pébrine*, which, if dried, perished within a year; whereas the former retained their life for several years. The dust of a silkworm nursery infected by *flacherie* appeared under the microscope largely made up of cysts or spores of vibrios, which would remain latent until wet or damp roused them into activity. Falling on the leaves which serve as food, they are carried into the intestines of the silkworms, grow and multiply there, and cause illness, unless the worms are vigorous, when they may be digested with the food. It is a struggle for life between the silkworms and the vibrios, in which the former are unfrequently victorious.

Accidental *flacherie* could be prevented by hygienic precautions; but when hereditary—*i.e.*, developed through diminished vitality of eggs or embryo—Pasteur resorted to the microscope, by which information as to the health of the worms, chrysalides, and moths for egg production could be obtained.

After the most patient study of this compound disease of silkworms, Pasteur had arrived at such knowledge of its causes, course, and different manifestations that he could at will produce either form—*pébrine* or *flacherie*, and could so regulate its intensity as to have it appear, experimentally, on a given day, almost at a given hour. But a remedy for the evil was not so readily devised. One form, *flacherie*, was capable of comparatively easy control, by care in feeding, and keeping the surroundings in a proper state.

With the other form—*pébrine*—by far the most serious, preventive measures were not so soon arrived at; but through a series of observations, as simple as they were ingenious, Pasteur concluded that the cause was to be combated in the eggs, and, acting on this view, he ultimately triumphed over the scourge.

The process now most successfully pursued in the silk-growing districts for avoiding the plague is described as follows:—

The cocoons are finished, and the appearance of the moths alone is waited for. They arrive, and they pair. Then begins the work of the cultivator, who is careful about the production of the eggs. He separates the couples at the end of the day, laying each female moth by itself on a little linen cloth suspended horizontally. The females lay their eggs. After the laying, the attendant takes each female in turn, and secures her by a pin passed through the wings to a folded corner of the little cloth, where are grouped some hundreds of eggs which she has laid. The male moth might be pinned to another corner of the cloth, but the examination of this creature is unnecessary, as he does not convey the disease. The female moth, after having been thoroughly dried by free contact with the air, is examined at leisure—as during the winter or autumn. Nothing is easier than to discover whether there are any *pébrine* corpuscles in its dead body. The moth is crushed in a mortar and mixed with a little water; then a drop of this is examined by means of a microscope. If corpuscles be found, the bit of cloth corresponding to the examined moth is known, and burnt with all the eggs it contains.

As has been mentioned, this protective or preservative measure has been found capable of unlimited application, and is universally adopted. In the Basses-Alps, in Ardèche, in Gard, in the Drôme, and in other parts, may be met with everywhere during the cultivation season, establishments where hundreds of women and young girls are occupied, with a remarkable division of labour and under the strictest supervision of skilful overseers, in pounding the moths, in examining them microscopically, and in sorting and classifying the little cloths upon which the eggs are deposited.

When he had completely fulfilled his mission in 1869, and had restored to France what might have been looked upon as a lost industry—through the

fatigue and intense application to which he had subjected himself—he was attacked with paralysis of the entire left side of the body, which left him prostrate for some time, and from which he has not yet entirely recovered. His proposed method of combating the Silkworm Disease was not accepted without serious doubts and opposition, for throughout his career he has had to contend continually with determined opponents, who have endeavoured, notwithstanding his lucid demonstrations, to ignore or minimise the grand results he has achieved. In 1869, while still suffering from the severe effects of his unfortunate illness, he, impelled by these doubts and contradictions, had himself carried to Alais, where he struggled, by giving directions from his arm-chair, through a repetition of his experiments, and succeeded in once more proving the certainty and simplicity of his method. The French Government, nevertheless, influenced by his detractors, still hesitated to adopt his process of culture; but the late Emperor interposed, and offered Pasteur the Villa Vicentia, near Trieste, belonging to the Prince Imperial, as a suitable locality for affording a convincing test of the plan, as for ten years the silk-harvest at that place had not sufficed to pay the cost of the eggs. Transported across France and Italy with difficulty, because of his helplessness, he succeeded in reaching the Imperial Villa, where his skill was rewarded with marvellous success; for in a short time the sale of the cocoons realised a net profit of twenty-six millions of francs. On this result being made known, the Emperor nominated him a Senator of France in July, 1870; but before the nomination was gazetted in the official journal the war with Germany interfered, and Pasteur returned to France to share in the misfortunes and mortifications of his country during that eventful period.

When the war was over, he commenced his studies on the preservation of beer, to which allusion has been already made. The results of these studies were so beneficial that they were universally recognised; and as an instance of the estimation in which they were held beyond France, it may be mentioned that a celebrated scientist of Copenhagen, Jacobsen, had a bust of Pasteur placed in the *salle d'honneur* of his celebrated laboratory. On the conclusion of the report which he made on these studies, Pasteur alluded to the principles upon which, for twenty years, he had pursued his labours—principles the application and advantages of which seemed to him without limit; and, firm in his conviction, he prophetically wrote, "the etiology (cause) of contagious diseases is on the eve of having unexpected light thrown upon it."

Two hundred years before Pasteur had achieved his well-deserved fame, England could boast of three men whose names yet stand pre-eminent in natural science—Newton, Hooke, and Boyle. Boyle was born in the year in which the great Bacon died, and he was the earliest, though perhaps not the most distinguished, of those who practically applied the precepts set forth in the "Novum Organum" of the Imperial Verulam, and is therefore the patriarch of experimental science—at least, in England—a science of which Pasteur is now one of the chief exponents. Boyle's genius as a physicist led him into many notable discoveries and surmises, and one of the latter is most memorable in relation to the subject which now occupies our attention, forecasting as it did the revelations effected by Pasteur in the direction indicated by him. "He that thoroughly understands the nature of ferments and fermentation," wrote Boyle, who had devoted much time, amid his multifarious studies, to this question of fermentation, "shall probably be much better able than he that ignores them to give a fair account of divers phenomena of certain diseases (as well fever as others), which will perhaps be never properly understood without an insight into the doctrine of fermentation."

The mention of contagious diseases recalls sad memories of agricultural

misfortunes in the United Kingdom for nearly half a century—of desolating plagues among all kinds of stock, for years unchecked and uncontrolled, then encountered with harassing and sterile legislative measures, until property of the value of many millions of pounds was lost, and agriculture was greatly crippled. The admission and the continuation of these maladies amongst our flocks and herds were due at first to the little that was known of their history or nature; and in later years, when their communicability was conclusively ascertained, their widespread ravages were unchecked, partly through indifference, and partly through mistaken economical notions.

It was not until the true nature of fermentation was elucidated, thanks to Pasteur, that the cause of communicable disorders in man and beast was satisfactorily and firmly established. The doctrine of a living infecting agent—a *contagium vivum*—in these maladies had certainly been accepted by physicians for a very long time, though it was based only on hypothesis; and even long before then, again, it was imagined, in explanation of the phenomena of contagion, that in transmissible maladies there was given off an imponderable and subtle matter—an *aura contagionis*—which was the active principle operating in their production; this unknown *something* could originate the disorders in healthy bodies into which it had penetrated from those already suffering from its effects. Then the chemical notion of the cause of fermentation, originated mainly by Liebig, was applied to these diseases, which were, and are now, consequently designated *zymotic* (from the Greek word for leaven). Like the ferments, the poisons and diseased processes were supposed to be the results of atomic disturbance peculiar to substances in course of molecular change, and capable of communicating themselves to the various constituents of the living body. As with fermentation, so with contagious diseases: the part played by the microscopic organisms, as shown by Pasteur, revolutionised our ideas and revived the doctrine of living contagia. And Chauveau, the eminent director of the Lyons Veterinary School, was the first to demonstrate that the virus of a contagious disease (Sheep-pox) was particulate, while putrefaction in wounds was due to atmospheric germs. In 1862, also, Pasteur had announced in his memoir on Spontaneous Generation, and in opposition to the views then entertained, that when urine becomes ammoniacal the alteration is caused by a microscopical fungus, and not by mucus or pus; at a later period he established the fact, that in affections of the bladder ammoniacal urine was always associated with the presence of this fungus, to the development of which borax, he discovered, was antagonistic. The application of this discovery in the treatment of urinary disorders has been most beneficial; as the dangerous fermentation of urine in the bladder is prevented by injecting a solution of borax, which causes no pain, into that organ. About this time, also, Lister, then a professor of surgery in Scotland, moved thereto by the researches of Pasteur, began his investigations into antiseptic measures in surgical operations, which he has since perfected to such an extent, that "Listerism" in the treatment of wounds is regarded throughout the civilised world as one of the greatest improvements in modern surgery: rendering the healing of formidable injuries more rapid and certain, and enabling the surgeon to boldly and successfully undertake operations which previously he would not have dared to venture upon, or which were in the great majority of cases fatal. Lister's method simply consists in excluding putrefactive and other germs from wounds, as well as from naturally closed cavities of the body which may have to be opened for the cure of disease.

Pasteur was naturally reluctant to enter upon the study of contagious diseases, though, from his success in elucidating the causes of fermentation and the silkworm disease, he hoped to gain, and indeed felt certain of arriving at, an exact knowledge of their origin. "I am neither surgeon nor doctor,"

he repeated, when urged to undertake researches into the transmissible disorders of men and animals. But at length he was induced to begin, and he selected for his study one of the most widespread and fatal of animal diseases—that which is known to scientists as Anthrax, and to agriculturists and others in this country by various names, some of them local: such as Splenic Apoplexy, Splenic Fever, etc.; and in France as "Charbon," and in Germany as "Milzbrand."

This Anthrax destroys wild as well as domesticated animals, herbivorous creatures and rodents being most susceptible, and it prevails, in one or more of its diversified forms, over probably the entire surface of the globe. It sometimes decimates the reindeer herds in the Polar regions, and is only too well known in the tropics and in temperate latitudes. The carefully-tended ruminants of the most highly civilised countries, suffer equally with the wandering herds and flocks of the Tartar Steppes; and the scourge is as much dreaded by the Finns and Lapps, as it is by the Mexicans, the Arabs, the Annamites, or the South African and Australian colonists. It has been carefully described by travellers, veterinary surgeons, and others, as they have observed it in Siberia, Lapland, Russia, Central Asia, and Asia Minor, China, Cochin China, the East and West Indies, Peru, Paraguay, Brazil, Mexico, North America, Australia, North and South Africa, and Egypt. Europe appears to be specially visited by it, and some parts suffer most seriously from its ravages. The books and papers which have been published with regard to outbreaks of the disease, and its nature, characteristics, and the damage it inflicts, are innumerable. Countries with extensive marshes, low-lying valleys, or a tenacious subsoil, are those most affected. Thus it happens that there are regions notorious for the prevalence of Anthrax—as the marshes of Sologne, Dombes and Bresse, Brie and Beauce, in France; and certain parts of Germany, Hungary, and Poland. It is enzoötic in the half-submerged valleys and the maritime coasts of Catalonia, and also in the Romagna, and other marshy districts of Italy; while it is epizoötic, and extends itself to people, in the swampy regions of Esthonia, Livonia, Courland, and, above all, in Siberia, where sometimes, in order to suppress the ravages of the terrible "Jaswa," as it is termed, the aid of the military authorities is called for, and battalions of soldiers are sent to bury or burn the thousands of infected carcases of animals which have died from it. And elevated countries are not exempted from it, for in the Bavarian Alps, for instance, it exacts an annual tribute of victims.

(To be continued.)

OBSERVATIONS ON THE EXAMINATION OF HORSES AS TO SOUNDNESS.

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(Continued from page 107.)

The sesamoid bones must claim our attention; any thickening in this region will interfere with the animal's usefulness, also in any part of the fetlock. We next feel with the forefinger and thumb down the cannon-bone for Splints. We sometimes find them on the outside of the bone. Everybody who thinks he knows a little about horses professes to be a judge of the amount of damage caused by a splint, from the smallest helper in the stable to the richest master of the racing stable. Certain it is that Splints are about the commonest blemishes met with; and were we to reject every horse having one, we would soon part company with both clients and dealers, as far as our professional opinion and advice are concerned. It is customary to judge of

splints by their situation, and the age of the horse. Expérience has shown that when situated near important structures, splints are decidedly unsoundness, causing severe lameness. But we must remember that almost every splint when forming produces more or less lameness, which passes off when it is formed. Hence the age of the horse must also be taken into consideration. There are three ways in which a splint may interfere with the usefulness of the animal.

1st. If situated close to the knee, the articulation of the knee may be interfered with. These splints are sometimes very difficult to detect, but by comparing the angles of the two knees, the one on which the splint is situated will be found filled up.

2nd. The Splint may extend inwards, and interfere with the action of the tendon or ligament.

3rd. Splints may be of such size as to be struck by the opposite foot.

Now, any of these splints render a horse unsound and less useful for work; but if a splint be found on any other part of the bone, and the horse is above five years, and shows no sign of lameness or tenderness on pressure, then we can venture to recommend the horse. Some splints are so small that it is very difficult to detect them. By flexing the knee and pushing aside the tendons we will be enabled to feel the part much better. It is hardly necessary to remark here that the lower end of the splint-bone terminates in a nodule, which to a person who has read about Splint, may be mistaken for it. I mention this because the same thing occurred to myself, many years ago, after reading about Splint in Youatt's book on the horse; but such a mistake made once is not likely to occur again, as it makes one very careful when giving an opinion; moreover, it snows the necessity of practical observation in all such cases.

We next feel the upper part of the suspensory ligament before it bifurcates. Also examine the heels for grease or scratches, both of which constitute unsoundness while they last. We have now examined the forehead, and if satisfactory, proceed to examine the trunk and hind limb. We pass the hand along the course of the spine and look out for fistulous withers, which is decidedly an unsoundness. Also for saddle galls, which constitute temporary unsoundness, especially if in a saddle-horse.

We may notice a broken rib, the effect of which may be an enlargement remaining, unless there is a sinus or discharge; beyond the eyesore it causes, it will not interfere with the animal's usefulness. We must be careful to look out for Hernia, which is, of course, serious unsoundness. The antero-inferior process of the ileum may have been fractured and displaced, which may be noticed by standing behind the horse and comparing both sides. Beyond looking bad, such a blemish does not interfere with the animal's usefulness.

We pass the hand down to the stifle joint and examine it. There may be a dropsical condition of the part; this is not thought to be of much account by some, but I should not care to recommend the horse. While examining here, we may take a glance at the sheath and inside of the thigh. It may be remarked that some men in examining the hind-leg always have a fore-leg held up, doubtless considering that "Self-preservation is the first law of nature." If the horse is very restive, at first this may be done, but afterwards he may be allowed to stand naturally, so that we can see evidences of flinching by pressure.

We next come to the hock, which, in my opinion, is the most difficult part of the whole horse to give a proper opinion on, and more diversity of opinion exists concerning health and disease in this than in any other part of the horse's body. You all know that the difficulty connected with the hock is to decide whether there is a spavin present or not.

Gentlemen, the subject of the hock would require a paper to itself; hence I can here only make a few remarks on it. It is well known that the hocks of different horses are far from being alike in shape, form, or feel—some are smooth, some large and rough, or what are named "coarse hocks." Now it is these so-called "coarse hocks" that give us all the trouble, and give rise to so much dispute. Some veterinary surgeons will decide that a horse has a spavin, others that he has not; each has his own opinion, and sticks to it, often bringing ridicule on the profession for want of a unanimous opinion on what appears to the public a simple matter. It is not my intention to notice anything in the pathology of Spavin, all concerning this may be found in that excellent work, "William's Surgery."

What I intend here to introduce as a basis for discussion is—

(1) What constitutes coarse hocks? Can they be distinguished from spavined hocks? and Are they to be considered sound?

(2) Does the position of a spavin indicate to us as to whether the animal affected can be more or less practically useful? Are we justified in rejecting a horse in all cases where spavins are detected, or can we, taking their situation into consideration, venture to predict whether the animal will be useful for the purpose required or not?

Gentlemen, these are practical and important questions, and fit subjects for an assemblage as at present here, where each can give his opinion and afterwards be modified by the opinions of older and more practised heads.

Our first consideration, then, will be: What is meant by the term "coarse hocks," or what the dealers technically call "double-jointed"? using this term often to the unfortunate buyer, when a spavin is present.

Some define a coarse hock to be one with a big frame and large development, others that it is a hock with extra large development of the cuneiform bones. There are some practitioners who do not believe in the term "coarse hocks" at all, but look upon it as a milder name for Spavin; and they never venture to pass a horse with such hocks.

But I would like to know what standard of hocks do such men take as a guide, for it is on this plea that they have to depend. We know well that hocks differ very much from one another in different horses. Taking the view above, some standard must be recognised, and all hocks different from it must be rejected. Now as to those practitioners who hold the idea of coarse hocks, and are, I think, in the majority, many difficulties arise as to where to draw the line. There is an opinion among some men that if both hocks are exactly alike in shape, although the enlargements on both are evident, still no spavin can be present. Now I would like to inquire from those holding such an opinion what is to prevent two spavins of equal size being on both hocks? Such men, if there is any difference in shape, and feel between the two hocks, pronounce the horse spavined.

Again I would like to inquire, May not both hocks be coarse, and one a little coarser than the other? Does it then follow that the horse is spavined?

At the meeting of the British National Veterinary Congress held in 1881, the subject of coarse hocks was discussed, but no very definite result was arrived at, most who spoke believing in the coarse hock system.

It may be well to consider how the two views will succeed in practice. Say we reject all hocks differing from what we consider the normal hock. Well, one thing is certain, we must reject quite a number of horses, and probably some good ones too. We will be considered fiends by the dealers, and fanatics by a good number of clients. Well, if all the veterinary surgeons in the district hold the same views, we are sure to get on all right. But how will it be, supposing we reject a horse with the so-called coarse hock, and he

is taken to the next practitioner and passed sound, and will probably turn out well; then our opinion does not go for much. Thus we must modify our view somewhat, and have a clear idea of what to reject and what to pass.

Now, what about the views of those who advocate the coarse hock system?

No doubt a lot of risk is run, and I believe chance alone makes the practice a success. Perhaps constant practice may enable us to distinguish between coarse and spavined hocks.

Now, these are questions on which great doubt exists, and to give a proper opinion on them requires more practice than I have had. However, a discussion from a meeting as at present here will do much to solve the difficulty.

Our next consideration will be, whether the situation of a spavin on the hock will be any guide to us in forming an opinion as to the probable usefulness of the animal. Of course, if we are asked as to whether a horse with Spavin is sound or unsound, then it will be apparent to all that unsound is the verdict.

But we are often asked more.

For instance, a man takes a fancy to a horse and wishes to buy him, although he may be spavined. He comes to us for an opinion as to whether the situation of that spavin will interfere with the practical usefulness of the horse.

Now, there must be some situation for Spavin, which is less liable to cause lameness; for how frequently do we see horses spavined for years and never going lame, and apparently little the worse for the defect.

Or take another instance. A man is buying horses cheap in consideration of their being spavined. Now, he may ask our opinion as to which of these horses will do his work the best and be least likely to fall lame.

British veterinarians, from their extensive and constant practice in a county where diseases of the hocks are frequent, from the severe work and sporting tendency of the people, have come to some sort of conclusion. Fearnly remarks, "Spavins situated very far back in the hock I have never known to produce lameness. I have again and again passed such, and have never had occasion to regret it."

Now, this is the opinion of a good number of practitioners who, no doubt, have it founded on experience. Those of you who read the report of the National Veterinary Congress of 1881 must have noticed how much this subject was dwelt on; but all the opinions were based on the results of experience. The question of how or why such a spavin would not cause lameness was not mentioned at all.

Three conditions seem to have been agreed upon as to the question of when Spavin causes lameness or not.

1. The situation of the spavin.
2. The age of the horse taken into consideration with it.
3. An idea that when the joint becomes anchylosed extra elasticity takes place in other parts, as in the fetlock joints, lateral cartilages, etc.

Now, one thing is certain if Anchylosis takes plac. Completely, there is no fear of lameness, at least, from the ordinary cause of spavin lameness. The only danger, then, is from interference with the tendon of the flexor metatarsi.

These practitioners appear to have an idea that after a certa n age the process of Spavin cannot go on. This theory of the situation of Spavin would suit admirably, could we always determine whether the process of Anchylosis was properly completed or not; but this it is impossible to determine. Also, it is a well-known fact that the process of Spavin can go in old horses.

Now that the old and absurd idea of Spavin has exploded—*i.e.*, that it is only found in the antero-internal part of the hock, where the enlargement is

seen most—I say that, as men get to understand that the process of Spavin may go on in any part of the hock, then the fallacy of passing a spavin, as regards its situation, will be apparent. How are we to ascertain, if an enlargement is seen on the back part of the hock, what process may be going on in other parts of the structure? The eye cannot see nor the hand cannot feel what destructive changes may be going on in other parts.

Taking these things, then, into consideration, I maintain that when an opinion is asked on any horse on which we find a spavin, in any form or situation, that horse should certainly be rejected, that is, if the opinion is to be sound or unsound. Fearnly, in his work, argues that there is less flexion and action in the back part of the hock than in any other; but he does not give his reasons. However, this is a question for you to decide.

Another disease of the hock joint which we must be careful to look for, is Bog Spavin.

Knowing, as you do, the pathology of this affection and the liability of the action of the joint being interfered with, it will be at once apparent that the horse possessing such a defect can neither be passed as sound or recommended to a client. But if it is in a young horse, especially of the heavy breeds, then the circumstances of the case have to be inquired into. For instance, a country horse is brought into a dealer's stable, and fed highly, without exercise; it is then very common to find a puffy enlargement on the hock joint, which, if the animal be properly fed and exercised, will disappear. In recommending such cases, take care and get a guarantee from the seller that the horse will work sound. As you know, Thoroughpin, when genuine, is always associated with Bog Spavin, and hence is an unsoundness. Take care, however, that the Thoroughpin is genuine, and not a distension of the synovial bursæ of the tendons above the hock. In the latter case the usefulness of the animal will not be interfered with.

We next look for Curb. In this defect some difference of opinion exists.

Men of experience have agreed that a curb on a seasoned horse, with otherwise good hocks, rarely, if ever, interferes with the usefulness of the animal, but certainly does not look well.

Curbs in young horses are never to be passed or recommended, unless a special guarantee be given.

However, the work for which the animal is intended must be ascertained in giving an opinion. Never recommend a curby horse for severe quick work.

Curby hocks, in themselves, are objectionable, especially on hunters, but do not constitute unsoundness. However, we must remember that it is a question, in most cases, of how the animal will do the client's work; hence, then, avoid such hocks, if possible.

Capped hock seldom causes lameness, but is objectionable from the fact that it is a sign of a kicker in the stall. We must also be careful to examine carefully into the nature of the capped hock; if the tendon is thickened and the bursa enlarged, then it is a serious unsoundness.

In front of the hock we may find a skin disease, called Sallenders. This is an unsoundness while it lasts.

We next examine the front of the leg in the same manner as in the foreleg.

The back part of the limb next claims our attention. Commencing at the tail, we notice many abnormalities in that region. Here melanotic tumours may be met with, which, according to the best authorities, constitute unsoundness. The tuberosity of the ischium may have been displaced; this can be detected by comparing both sides. Such a defect does not interfere with the usefulness of the animal, but looks very unsightly.

Next we examine the back tendons, pastern and foot, as in the fore leg. We have now finished the examination of the near side.

We must examine the off side in just the same manner, commencing at the head, and going backwards to finish at the off hind-leg. When this is completed, we have finished the examination of the horse as he stands. It now remains for us to determine whether we will reject him for any defect or not.

If he is satisfactory, then we must continue our examination, which consists of three parts, and are very important—

1st, Testing for lameness ; 2nd, Testing the wind ; 3rd, Removing the fore shoes, and examining the feet carefully for corns.

Now as to the first of these, I need not remind you of its importance, as any man who passed or recommended a horse the slightest bit lame or tender to a client would have little reputation in his district after. Nearly every one fancies he can tell at a glance whether a horse is lame or not, but in this they are often mistaken. In some cases it is not a very easy matter, and requires a perfect knowledge of normal action ; besides, we have every obstacle placed in our way by the dealer or seller of the horse. To test properly for lameness, a trot on hard ground is required, and to test the hard parts, such as the bones, etc., by concussion ; a gallop on soft ground is also required, to test the muscles and ligaments. We first begin with the trot on hard ground. The seller or his servant should have nothing to do with the horse. We must have our own man to manipulate the animal. The trot must be slow, and the animal is to be held with a loose rein and halter, and trotted both towards the examiner and away from him, as often as is thought necessary. In doing this we must take particular notice of the animal's action, how he turns round, etc., taking care that the ground is perfectly level. Let us suppose that the horse is a little over on his fore-legs, but goes quite sound. Now what are we to do? In the majority of cases I think this is due to hard work, and the contraction of the tendons ; hence it is better to reject such a horse, as he is never safe, and his power for work cannot be depended on. Here also Stringhalt may be noticed. Of course, except it be for a cab-horse, etc., nobody would think of buying a horse with Stringhalt. The trot having been satisfactory, the gallop on soft ground must be enforced, and during this process the wind may also be tested. It is essential that the ground be soft. Nothing suits better than a grass-field, as then the hoofs make little noise, and the respirations can be well heard.

The horse is to be run round in a circle, so that the examiner may hear as much as possible of the respirations.

Roaring is easily detected ; the old plan of threatening the horse with a stick to see if he will grunt is not a sure test. When on the move, the practised ear will soon detect the abnormal sound, which is, of course, an unsoundness.

Soft whistling may occur during an attack of Laryngitis, and is not a permanent unsoundness ; but until it has disappeared we cannot recommend or pass the horse.

Dry whistling is a very serious defect ; it is due to a diminution of the calibre of the larynx from permanent thickening of the mucous membrane or other causes. It can easily be detected. Perhaps the horse has a cough. This may be temporary unsoundness, in which case a special guarantee is to be taken ; if chronic, it is a permanent unsoundness, and is easily recognised by the practised ear.

Broken wind is easily recognised, and is, of course, a most serious cause of unsoundness.

Dealers may doctor up a horse with drugs, etc., as much as they please, but our plan of testing the respiratory organs will soon discover any fraud. If the horse and his wind have been satisfactory so far, the veterinary surgeon is to mount the animal himself, to further make sure of his soundness ; of course, this is unnecessary in cart-horses, but specially necessary in saddle-horses, hacks, and hunters.

As most veterinary surgeons are, or are supposed to be, able to ride well, there will be no difficulty to them in this part of the performance.

To those veterinarians who have not the possession of this agreeable and useful art, I would say, Go and learn at once ; it is never too late to mend or to learn. This is especially needed in a country where many hunters are bought or sold, as the veterinary surgeon's opinion is frequently asked with regard to the action and capabilities of horses. And unless he is able to ride, how very little he must know about horses or their action. In fresh horses a little care is necessary, or we may tip the earth without intending it.

When mounted on the gallant steed, put him through his paces, and send him up the nearest hill at a good canter, so as to test his wind thoroughly.

When examining harness horses, we should always have them taken out of harness.

We must also see that the horse can back and turn round properly.

We next have the animal's fore shoes removed, to examine carefully for corns, etc.

If we object to a shoeing-forge in connection with our establishment, why we must either hunt up the nearest blacksmith or do the operation ourselves ; and as all veterinary surgeons are not adepts at putting on or removing shoes, we shall soon see the advisability of keeping our own shoeing-forge.

Well, we must confess that blacksmiths are very useful men in a veterinary establishment, and, so far as I have seen, are very remunerative, and do all work of this kind connected with the feet much quicker than the average veterinary surgeon can, and with much less fatigue.

(*To be continued.*)

UPON THE CAUSES AND PATHOLOGICAL ANATOMY OF ROTHLAUF, OR SWINE FEVER.*

Synopsis of Mr. Lüpke's Address to the Veterinary Association of Stettin-Stralsund.

The lecturer drew attention to the great importance of bacteriology, to Swine Fever as an agricultural question, to the great services rendered by Schütz, recognised those of Lydtin, and pointed out the relation of bacteriology to practice. He then took his hearers chronologically through the history of bacteriological research from its cradle. One of the first results of this branch of study was to separate Swine Fever from Anthrax. The next stage (as far as Swine Fever was concerned) was the investigations of Detmers and Long in America ; but Lüpke stated their results were not satisfactory, and were probably caused by the inoculation of a mixture of septic with typhoid bacilli. To this category he added the experiments of Klein in London, who appeared to have had to do with Bact. termo.

The question was brought to a fresh stage by the splendid labours of Pasteur. Stimulated by Pasteur—who in 1882 attributed the disease to a figure-of-eight bacillus—Loeffler and Schütz took the matter up. They found, in opposition to Pasteur, that small, slim bacilli, which Schütz measured 0·001 to 0·0018 mm., are more constantly present. At the same time, Loeffler discovered in a pig, which, according to Eggeling, had died of Swine Fever, another bacillus *sui generis*. These facts point to the presence of two diseases, Red-soldier and Swine Plague (Rothlauf and Schweine-seuche), hitherto known as one. Sufficient light has not yet been thrown upon the subject to allow of differential diagnosis in practice ; but the symptom which gives the disease its name (Red Soldier) is not always present, and it is not

* Translated from "Wochenschrift für Thierheilkunde and Viehzucht." No. 29. Juli, 1886. By F. Raymond, A.V.D.

pathognomonic withal, as it is well known that in Septicæmia, Nettle Rash, etc., redness of the skin occurs.

The lecturer then described the behaviour of the bacilli, and mentioned that, in opposition to Schottelius, he saw no movements of the bacilli, and attributed those seen by Schottelius to Brownian movements. The results of Schütz's inoculations with material fourteen days old, seem to show that spores are formed, although no actual proof is to hand.

Speaking of the distribution of the bacilli in the body, Lupke said they are mostly found in the blood, particularly of the small vessels of those organs which contain most of that fluid. The spleen contains most, then the kidneys, and, according to Schottelius, the glomeruli, probably because the circulation in them is very slow; they are also present in the vas efferens. The mucous membrane of the intestines harbours them, whereas the mucous membrane of the bronchial tubes and alveoli show none. Contagion, therefore, probably takes place through the digestive system.

Speaking of the pathological anatomy of the disease, Lupke repeated that the redness is an insignificant symptom. It may be diffuse or sharply circumscribed, and is caused by inflammation. Autopsy shows—

1. The intestinal tract is always implicated, but the rectum rarely. Peyer's patches and follicles are always found much diseased, and, by swelling, protrude from their surroundings and are marked a blue colour. In opposition to Schottelius, the lecturer had never noticed ulceration of these lymphatics, from which Schottelius draws analogy to the Typhus of man.

2. The spleen is invariably diseased, swollen, and hyperæmic, and coloured dark red. Lupke states that the bacteria multiply after death.

3. The liver is always enlarged; this swelling is distinguished from physiological enlargement by rounding of the edges.

4. The kidneys are constantly enlarged. They are externally brownish-grey and opaque, and if the disease has lasted any length of time they show considerable parenchymatous change, and the centre is strikingly dark, owing to congestion brought about by pressure of the vessels of the cortex.

Of less importance are the signs exhibited by the other organs. The lungs are expanded and appear œdematous. The pericardium and peritoneum sometimes contain fluid. Hæmorrhagic spots are found upon the epicardium, and also under the endocardium of the left ventricle, principally where the edges of the valves strike, on the cordæ tendinæ and muscular pillars. The right ventricle is moderately dilated, the left constricted. The lymphatic glands throughout the body are invariably implicated. Their follicles are swollen, and their capsules dark red or reddish-brown. Lupke then spoke favourably of inoculation, but said it was still an open question, because sufficient was not yet known about the attenuation of virus.

ROYAL COLLEGE OF VETERINARY SURGEONS.

Fellowship Examination.

AN examination for the above degree was held in Edinburgh on July 22nd, when the following gentlemen were admitted "Fellows of the Royal College of Veterinary Surgeons":—

Finlay Dun, Esq. ...	... Member of the Board of Examiners.
John Burnett, Esq. ...	... Maybole, Ayrshire.
Thos. H. Simcocks, Esq.	... Drogheda.
Andrew Smith, Esq. ...	... Principal Toronto Veterinary College.
John Freeman, Esq....	... Dublin.
Benjamin Smith, Esq.	... Barnsley, Yorkshire.
James Storrar, Esq. ...	... Chester.

Membership Examinations.

At meetings of the Scottish Section of the Board of Examiners, held in Edinburgh and Glasgow on and between July 12th and 24th, the following gentlemen passed their Final Examination and were admitted "Members of the Royal College of Veterinary Surgeons":—

New Veterinary College.

Mr. A. Watson	Dublin.
„ G. Finlay	Belfast.
„ J. Fletcher	Sheffield.
„ S. J. Bradley	Bradford.
„ F. Sweeting	Pontefract.

Dick Veterinary College.

Mr. J. Gemmell	Glasgow.
„ F. Tonar	Exeter.
„ J. Graham	Derry.
„ L. Power	Tipperary.
„ C. McGregor	Aberdeen.
„ A. Marshall	Plymouth.
„ J. Moir	Armagh.

Glasgow Veterinary College.

Mr. R. Clunas	Nairn.
„ J. Brown	Leshmahagow, Lanark.
„ D. Wooley	Bute.
„ W. H. Dalrymple	Stranraer.
„ J. Gibson	Biggar.
„ A. Paton	Troon, Ayrshire.
„ G. Miller	Wigtown.
„ B. Cook	Swansea.
„ R. S. Thomson	Kirkwall.

The following passed their Second Examination:—

New Veterinary College.

Mr. E. Learoyd.
„ T. M. Inglis.
„ W. J. Tatam.
„ H. Race.
„ A. D. Dunbar.
„ F. L. Carter.
Mr. R. D. Horne.
„ W. J. Wood.
„ T. Chalmers.
„ J. Dickie.
„ J. Carson

Dick Veterinary College.

Mr. W. H. S. Day.
„ D. Hodge.
„ J. Sheehy.
Mr. S. J. Hewett.
„ W. Dagg.

Glasgow Veterinary College.

Mr. J. Campbell.
„ J. D. Miller.
„ F. G. Warmington.
Mr. J. Macfarlane, G.C.
„ A. B. Baird.

The following passed their First Examination:—

New Veterinary College.

Mr. J. M. Yardley.
„ A. Shawcross.
„ J. Gilmour.
Mr. T. Lillico.
„ W. A. Macdougal
„ H. McKie, G.C.

Mr. J. McCord.
„ W. Kydd.
„ D. Cameron, G.C.
„ W. F. Egan.
„ A. Duvall.
„ F. W. S. Clough, V.G.C.
Mr. C. A. Szarbinowski, G.C.
„ T. Williams.
„ F. Thomson, G.C.
„ J. Murray, V.G.C.
„ C. Anderson.

Dick Veterinary College.

Mr. S. Clarke.
„ W. Gray.
„ C. Wade.
„ E. P. Mullam, G.C.
„ J. G. Clayton, G.C.
„ J. A. Gold, V.G.C.
„ A. Breakill, G.C.
„ C. D. Watkins.
Mr. J. B. Manuel.
„ H. Harris.
„ M. Clarkson, G.C.
„ W. Braes.
„ R. Bassett.
„ W. Thorpe.
„ D. C. Smith.

Glasgow Veterinary College.

Mr. A. Mackenzie.
„ J. C. McCrindle.
„ W. Robb.
„ J. R. O'Realli.
„ J. M. Stewart, G.C.
„ J. L. Orr, G.C.
„ J. Ferguson, G.C.
„ R. Hamilton.
„ J. Borrowman, G.C.
Mr. L. Crook.
„ A. K. Hart, G.C.
„ C. B. Freeman, G.C.
„ J. Forbes.
„ A. E. McConnell.
„ W. B. Gardner.
„ H. Munroe.
„ D. Imrie.
„ A. Veitch.

R. RUTHERFORD, F.R.C.V.S.,
Secretary, Scottish Section, Board of Examiners.

Proceedings of Veterinary Medical Societies, &c.

SOUTHERN COUNTIES VETERINARY MEDICAL ASSOCIATION.

(*Continued from page* 141)

In the first case, if a dog bit others, and was really mad, it was destroyed. It might happen that the supposed rabid dog was destroyed, and if it was not rabid people were kept in a state of anxiety for a long time. It was therefore important to say whether a dog was rabid or not. Supposing they obtained one or more points of the diagnosis, they knew of M. Pasteur, and he might be resorted to, and the people sent to him. The diagnosis of the malady should be established with the same accuracy and knowledge of the symptoms as in pathological anatomy. Four or five pathological symptoms of Rabies should be taken before coming to the conclusion that a dog was rabid. These they knew as well as he did. The altered manner of the dog was one of the earliest symptoms. If friendly before, he changed, and looked dangerous, morose, and had a tendency to bite. Then there was the morbid appetite, a masticating of various things, swallowing earth and other kinds of mess. Then there was the tendency to wander. A rabid dog appeared to be impelled by some strange sentiment to avoid his master's family and run away. It might run for miles, and wander about, biting any men or animals it might meet. This was very important, because dogs, which perhaps did not show the morbid appetite he had mentioned, had been absent for some days and come home apparently

well, but ultimately died. Therefore they had three symptoms. But one most marked tendency, that of aggressiveness, was a peculiar feature of the malady, apparent not only in the dog, but in every animal once affected, and often in the most timid creature. He saw a rabbit the other day which had been inoculated by the Pasteur remedy, and it was flying at every one. This was very important, for if a dog exhibited this symptom in addition to the others, the evidence was strongly in favour of the dog being rabid. Another symptom was the altered physiognomy. Those who had seen much of rabid animals, especially dogs, could tell them of the peculiar expression of benevolence, melancholy, fierceness, and a kind of demented expression not to be described. But this he could not lay down as a classified symptom without more experience. Another symptom was paralysis, which was always a well-marked feature in cases of Rabies—the paralysis which attacks the hind-quarters first, and ultimately affects the whole body. This was also a diagnosis : the gaping mouth, dry tongue, squinting eyes, and haggard expression of the countenance were always sufficient to satisfy any one. The pathological anatomy was not certain, but nevertheless there were two or three symptoms which at present enabled one to come to a conclusion. The extreme congestion of the back part of the mouth and larynx, and the same congestion of the membranes of the *stomach* were common. There was also the altered voice of the rabid dog, which might be looked upon as simply startling. He saw some the other day ; one died, another was paralysed in the hind-quarters. The bark of a rabid dog could not be mistaken, and once heard it could never be forgotten. They ought to exercise the greatest care when asking for information as to the presence of Rabies in a dog, and ought to satisfy themselves that certain symptoms were really those of Rabies. He did not know any other symptoms beyond those mentioned by which to diagnose Rabies, and he came there to know if they could tell him some more. One test had been recently put into practice, which he thought most valuable. M. Pasteur had discovered, by means of intercranial inoculation of rabific matter from an animal which had died of Rabies, that the disease was produced in a certain time and the patient died. At New York recently, a professional man was called in to say if a dog, which had bitten a lady, and since died, was mad. The lady had been sent to Paris. He examined the dog, and found certain indications, but could not give a positive opinion. He obtained some rabbits and inoculated them intracranially with some of the spinal cord of the dog, and within sixteen days they died. Here, then, was a valuable guide ; and, from experiments he had seen conducted, he (Dr. Fleming) was perfectly certain that, by intercranial inoculation of rabific nerve-matter, within eight or ten days they could decide. This was most valuable, but the difficulty was to carry it out. In the first place, he was not sure whether in this country, before practising this, the veterinary surgeon should not have a license. He would rather recommend a veterinary surgeon who had a mad dog—or the carcase of one—presented to him to try it. It was the same in Glanders ; where there was a slight discharge, and they were not certain, it could be decided in a fortnight. This was very valuable, and the certain knowledge might save a regiment, or human lives. He thought, therefore, that they would be quite justified in making a test. He mentioned the matter of diagnosis because he thought some mistake might be made, and believed there was a large number of erroneous notions. He thought it was their duty to attempt, if possible, to save the alarm which the presence of the malady in large populations occasioned. With regard to the prophylaxis of the malady, if they understood it, and if the Legislature cared much for the lives of the people, they would have been rid of the disease long ago. He thought it was rather disgraceful that they should allow maladies to exist which were terrible to a human being and also a

great scourge to animals. It spoke rather sadly of their notions of the value of human life. They had a disease (Syphilis) kept among them through sheer sentiment ; it destroyed the health of a population and public property. He trusted that in a short time the prophylaxis of Rabies would be so well understood that they would know the disease no longer. At the same time there was much sentiment shown against the measures taken in London. It was one of the most useful measures in order to the prevention of Rabies—the suppression of the number of wandering dogs, ownerless dogs, and those kept by owners who would not attend to them. The most prolific source of danger in this country, he was sure, was the wandering dog. Some would wander, but some had no home, and lived on doorsteps, and ran the streets. They destroyed gardens, and were a public nuisance. No feeling of sentiment should stand in the way of getting rid of them. This would be one of the first steps towards getting rid of Rabies—get rid of these dogs, destroy ownerless dogs, put a tax on owned dogs, and let them be cared for ; let the tax be sufficient on those dogs which were kept as pleasure dogs, to ensure that their owners would be able to look after them. In an outbreak of Rabies it was most important that those who kept dogs should protect them ; and this not only with dogs, but other animals also. The only safe course was to muzzle them, and this would prevent them biting. He did not think the muzzle would hurt them, and they did worse things to other animals. He maintained that the bit in the horse's mouth was more trying, and that the muzzle was not a punishment, though at first it caused restlessness. The horse got accustomed to the bit, and dogs became positively used to the muzzle ; indeed, he knew a dog who would not go out till his muzzle was put on. It was in Manchester when Rabies were prevalent, and he would not go out, but barked till the muzzle was got down. The talk about a muzzle being cruel was all sentiment and nonsense, for dogs could be made to obey a law like human beings. The muzzling of dogs, the diminution of the number of useless dogs, and the suppression of wanderers, were the chief things with regard to the prevention of Rabies. He thought himself, if the malady was to be allowed to exist among them as it had before for many hundreds of years, sometimes breaking out with great violence, the public should be informed of its nature as much as possible. It might easily be done by adopting what he suggested, and printing on the back of the license paper the early symptoms, by a knowledge of which people could be on their guard. It was very simple, but never done. He thought that was all he could say as to the prevention of Rabies. The prevention of Hydrophobia in mankind was a question upon which their medical friends were more qualified to speak than himself. He could not, however, avoid speaking of the remarkable discovery of M. Pasteur. No doubt Pasteur's work had been so far profoundly philanthropic, and his great experience, justified in so many ways before, made the public say he had been trustworthy hitherto, and they must trust him now. He must confess that at first he (Dr. Fleming) was rather sceptical as to the value of his inoculatory process, but a number of people—some 1,400—had been under his treatment, and as yet few of them had died. The number of deaths was extremely few ; he did not believe they were any more than would be found from ordinary vaccination ; they might be three, four, five, or six in the 1,400 people bitten, to a large extent, at least, by rabid dogs, and this showed there was something in it. He believed the time would tell that Pasteur's was one of the finest discoveries this generation had ever seen. They all knew the method of procedure and the operation by which he obtained his virus. The thing was so simple that he should imagine there would be no difficulty at all with regard to introducing the practice into this country. But, nevertheless, much as he respected M. Pasteur and admired his wonderful genius, he must say this—that he would

rather get rid of Rabies altogether from the country than rely on this protection. (Hear, hear.) The centres of infection were very few. It was a preventable malady, and he would at once suppress the disease. At one time he was not a believer in its being purely contagious, but believed it might arise sporadically. He now recanted, and felt that it was entirely contagious. All kinds of reasons were given for its being of spontaneous origin—heat, absence of sensual gratification, etc. But if they looked at them they would find the reasons did not hold good. In Australia, where dogs abounded, they had to undergo harsh treatment, and stand a higher temperature, but Rabies was never known. But let them once introduce a rabid dog to run about, and they would have the disease as active as in this country. In New Zealand and Reunion a case of Rabies was never known, yet in the neighbouring island of Mauritius, where there was no prevention, they had the malady all the year round, sometimes very severely. Instead, therefore, of seeking to protect animals or people by Pasteur's operation, he contended that the Legislature should devise measures, and have them enforced, by which to stamp out the disease altogether; and there would be no difficulty in this. The incubation did not exist longer than twelve months, and therefore if measures were taken all over the kingdom to prevent cases of Rabies for twelve months they could get rid of them altogether. Let it also be kept out by imposing a quarantine upon dogs coming into ports, and then he thought they would be saved from Rabies for all time. It should be looked upon as a contagious disease, the same as the Foot-and-Mouth Disease, and as a very fatal malady. He thought the time had come when it was rather a reflection upon them to allow it to remain as a matter of sentiment; and for the sake of the dogs themselves, he urged, they ought to suppress Rabies and get rid of it altogether. He confessed to always looking with suspicion upon a strange dog, but that feeling could not exist if Rabies were stamped out. In concluding, Dr. Fleming reiterated his opinion that the Legislature should devise measures for the suppression of the disease. He trusted that what he had said would elicit some remarks from those who had had experience. The subject was important from a pathological point of view, and still more so from a sanitary aspect. (Applause.)

The PRESIDENT said he was sure the sentiment of all would be to thank Dr. Fleming heartily for the light he had thrown on this direful disease, which perhaps more than any in the country was communicated from animals to the human subject; and he thought the greatest compliment they could pay him would be to invite a general discussion. (Hear, hear.)

Dr. MACLEAN said he would much rather some member of the veterinary profession would have spoken first. He had the misfortune himself to see a great deal of the disease, and during twenty-two years' service in India was perpetually meeting with it. He might say he had not been landed five days on the Coromandel coast when one of the first pieces of duty he had to do was to attend the most beautiful Hindoo child he ever saw—a child whose face, he might say, after these many years, haunted him still. She had been bitten by a mad dog, and was suffering from all the symptoms of Rabies; he need scarcely say, for they all knew it too well, that she died in due course with all the symptoms of Hydrophobia. One thing which made him refer to that child was this—the remark about the peculiar expression of the dog. About four or five years after this, he was in the act of mounting his horse one evening—at that time being attached to the Court at Hyderhabad—when the gardener came up, leading a little boy by the hand, and appealing to him to do something for the lad. He turned round and looked at the child, and the moment he saw his face, that instant the expression of the Hindoo child rushed into his mind. He saw it immediately, and the incident came back to

him when Dr. Fleming spoke of the expression which could not be described. On the occasion he was referring to he dismounted, went into the house, obtained a glass of water, and offered it to the boy, who was instantly afterwards rolling on the ground in agony. The child had been bitten by a large pariah dog. The place was so infested by them that a person could not go outside the gate at that time without encountering thirty or forty ownerless dogs, and one of these had come into the compound and bitten the child. He acted on the principle laid down by Dr. Fleming, and ever after if one entered his gate he unhesitatingly shot it. In the East there was a great feeling against killing them, though they were undoubtedly the means of keeping up the disease. The difficulty in India was very great, and he had himself seen eight or ten cases in that country. Another thing was as to the possibility of suppressing the disease. Many present knew that in the city of Berlin, ten, fifteen, or twenty years ago, there was a regular epidemic of Hydrophobia, which prevailed to an enormous extent. The Germans dealt with a question of this kind in a much more summary way than the English. They were not so much under the dominion of fads or faddists as in this country, and sentiment, false sentiment, did not prevail with them as with us. The first thing the German Government did was to offer a prize for a form of muzzle which would effectually protect the public, and at the same time not distress a dog, but allow him to depress his lower jaw, and breathe by his mouth. As soon as that was done, every dog seen outside his master's house without his master or a muzzle was instantly destroyed; and in less than twelve months the disease was stamped out. This was not only so in Berlin, but all over Germany; and when in Dresden, he was told by a practitioner that he had not seen or heard of a single case of Hydrophobia since the time these regulations were introduced. He brought some of the muzzles home for a large dog which belonged to his distinguished late fellow colleague, Dr. Parkes. Dr. Parkes had often told him that he never permitted the dog to go out of the house without the muzzle, and he became not only habituated to, but rather proud of it. It was in the form of a helmet. It was a cruel thing to see how some people strapped up a dog's jaw, and he could conceive nothing more likely to send a dog mad than that. There was also another objection to be overcome. He spoke just now of fads and faddists. Within a few weeks ago, a distinguished philanthropist in this town (Southampton) was at Ilfracombe, in the West country. He there attended a meeting summoned for the express purpose of putting down vivisection, and who did they suppose this gentleman held up to execration as an enemy of the human race? Mons. Pasteur, forsooth, because he killed a few guinea-pigs! These faddists would put a guinea-pig in one scale and a human life in the other, and say the guinea-pig was worth the man! (Hear, hear.) The gentlemen present could do a great deal to clear away such mistaken notions. There were many things in Rabies he never thoroughly understood until that day, and as far as he could he would do his best in every channel open to him to propagate them. Always, and in every way he could, he had been a bitter enemy to fads and faddists, and always had the courage of his opinions in matters of that kind. In that very room, when delivering an address to the Southampton branch of the Medical Association, he took the opportunity of hitting them as hard as he possibly could. An example of the kind of teaching which the public got from faddists of that description might be cited. A great meeting was held in the county, with the Bishop of Winchester in the chair, and a Mr. Douglas (he thought the name was), travelling secretary of the Anti-Vivisection Society, had the audacity to declare, as a matter-of-fact, that in some of the Scottish hospitals Edinburgh and Glasgow surgeons did not hesitate to perform vivisection on human beings! On being challenged for proof, he (Dr. Maclean) need not tell them no proof was forth-

coming. Of course they were going on propagating lies and things of that kind, but from that day they naturally never heard more of Mr. Douglas. (Applause.)

Mr. SIMPSON said it had been his misfortune, as well as fortune, to see several cases of Rabies in the dog. If they would allow him, he would suggest another point; it occurred to him simply as an omission, because he felt that Dr. Fleming, with the knowledge he had of the disease, and the manner in which he had watched it, must be aware of it. The symptom he thought was omitted was the inability to lap, or rather the desire to lap, but the inability to swallow food. He never remembered to have seen a case of Rabies in a dog where the symptom of paralysis of the throat was absent. They had heard of something like 500 dogs being destroyed in London as being affected by Rabies. If they accepted those figures, it was very difficult to believe that Hydrophobia was that serious affection that they had been told of. For his own part he disbelieved the figures. (Hear.) Dr. Fleming was content to divide them by two; but he maintained that if they divided them by eight they would be nearer the mark. If there were in London during the past year 250 Rabid dogs, there were a great number of people bitten by them; but he was not aware of any statistics to enable them to obtain a correct knowledge of the number who were bitten, and of the persons who became Hydrophobic. This led him to say that he did not believe one person in a hundred who were bitten by rabid dogs became affected. They were fortunate to-day in having amongst them a medical gentleman able to tell them something, because he had seen the disease; but he (Mr. Simpson) had spoken to many medical gentlemen, and asked them about Hydrophobia, and the reply in nine cases out of ten was that they had never seen a case. A case had never come to his notice, though a brother practitioner happened to have one and called him into consultation. He thought this went a good deal to prove what he said, that he did not believe that one person in a hundred bitten by a rabid dog became affected. They knew perfectly well, and it was not necessary for him to point out to them, why persons in England were less likely to become affected by the bite of a rabid dog than the natives of India. A rabid dog in England, coming across an Englishman, clothed as an Englishman should be with trousers, perhaps attacks that man. They would quite understand that the teeth passing through the cloth trousers would become white and cleansed, and perfectly free from virus, so that no harm was done. The case was different in India, where the legs were not protected, and when a dog attacked a native it unquestionably at once inoculated him, and he became a subject of Rabies. But even in this case, though he had never been in India, he was disposed to think that a very small proportion of those bitten became affected. He said this because he had seen several cases—many cases—of Rabies in the dog, and he had known several people to be bitten by these unfortunate subjects of Rabies, but never saw a case of Hydrophobia result from those bites. But a doubt might arise in the minds of many of them whether those dogs he said were rabid were really so affected. He answered that unquestionably they were—not the smallest doubt about it. The whole of the symptoms described by Dr. Fleming were present in every case he had seen, adding also the desire to lap and the inability to swallow. And in those cases where they had the opportunity of mak ng a *post-mortem* examination, there was found in the *pharynx* at the back part of the throat, especially referred to by Dr. Fleming, as well as the accumulation of foreign matter, pieces of grass, sticks, horse-manure, and all such things. He had known people bitten by dogs who had been mad, as shown by *post-mortem* examination. They had for a long time been troubled, but never died. A lady had her unprotected arm bitten by her pet dog; that was two years ago, but she was still alive. He did not say the dog

was rabid, but took the dog to his own house, and there made very short work of it. Unfortunately, they were not in a position to hear much of the experiments of M. Pasteur, and he regretted this very much, but it was the fault of their own Government that they did not hear more. He thought it was a shameful thing that the veterinary profession was not consulted sooner on the subject, but better late, perhaps, than never; and if he was wrong, Dr. Fleming would correct him when he said that a veterinary surgeon, in the person of Dr. Fleming, was now added to the Commission of Inquiry into the method of treatment practised abroad. (Applause.) For his own part, he was inclined to be a disbeliever in the system adopted by this learned gentleman. His belief was, and he should continue to hold it until he heard from one of their own veterinary surgeons that it was not so, that many people had been inoculated with Hydrophobia, and had died, where they would not have died otherwise than by this system.

Dr. CHEESMAN said he could not speak theoretically, but only by past experience. He had been in the medical profession now going on for fifty years, and could bear out the testimony that very few medical men had seen a case of Hydrophobia. He never had in his life; and when they came to take deaths, there were only about two out of a million, from what he had read. M. Pasteur's system was all very well, but, as was remarked, it was not every person bitten by a dog had Hydrophobia. He had been bitten, and members of his family also, but was a disbeliever in M. Pasteur. It was not because a rabid dog bit a human being that that person should necessarily go mad with Hydrophobia.

Mr. GOODALL, speaking of the period of incubation, said he was on the previous day talking to the master of a pack of hounds, who had a few years ago lost a whole pack from Rabies. This gentleman told him that undoubtedly in one case the incubation stage extended over fifteen months. Therefore a twelve months' limit was not long enough. As to the number of people bitten, he had seen cases of Rabies, but, happily, not frequently, though he had had a good deal of communication with people who had. They had it at the Queen's kennels a few years ago, and his uncle, the huntsman, had a plan of making sure of his case. He used to take the hounds out to Ascot heath, and cheer them on; then he could pick out the hounds which were going to have the disease by their appearance, and by this means saved the pack. Mr. S—— had told him yesterday that when some hounds were being hunted in the New Forest some time ago, he noticed one working remarkably well, and undoubtedly this would be the first to have it again. There was an over-excitability in each case. The remarks had been simply upon dogs in towns, but if the disease got into a pack of foxhounds it was more important. There was one way of getting rid of it—by raising the tax; and while he quite agreed with this, he was the last man in the world to take away a man's dog. Some loved their dogs, but every one should be taken care of. When he was assistant to Mr. Mannington, of Brighton, he remembered there was an outbreak of Rabies, and a mad dog ran right through the town. A butcher, who held him till he was killed, was badly bitten on his bare arm. A *post-mortem* on the dog showed there was no doubt of its having been rabid, but the man did not die. While still at Brighton, the Master of the South Down Hounds sent him a spaniel for examination. In the stomach he found a collection of foreign bodies, and he wrote back to say he was afraid it was a case of Rabies, and should advise that action should be taken. His friend wrote back that there was not the smallest fear; the dog had been perfectly well the night before, and was found dead in the place, they believing him to be poisoned. It did not do always to rely on that.

Dr. DE CHAUMONT said he had very little to remark, but, being called

upon, he would say what he could. Like others who had spoken, he had never himself seen a case of Hydrophobia in the human species, though he had seen a few dogs which were said to be mad. He had a case in India, where a soldier died apparently from Hydrophobia. In that case the only trace of a bite which could be found was one received four years before, when the man embarked at Portsmouth for India. The man himself, when asked about it, had so far forgotten the incident that he denied ever being bitten at all. They were put into grave difficulty sometimes by not knowing whether the animal was really rabid or not, and, as Dr. Fleming told them, if they could not depend upon the diagnosis, the statistics fell to the ground. Formerly, at any rate, the statistics used to be stated as one in eighteen cases really bitten by undoubtedly rabid dogs. He once met with a curious case of uncertainty. His distinguished predecessor, Dr. Parkes, was formerly assistant-surgeon in the Army, in the Madras Presidency. A little dog, which showed extreme symptoms, bit Dr. Parkes and a soldier, and died the same night in convulsions. People said the animal was rabid, and that there would be two cases of Hydrophobia, but Dr. Parkes was not afraid. The unfortunate soldier really suffered in apprehension of Hydrophobia for a long time. Six months afterwards he came into hospital; he could not swallow, and thought it was Hydrophobia, and ultimately died. When the *post-mortem* was made, they found an Aneurism of the aorta, which clearly gave the cause of his being unable to swallow. There was the greatest difficulty in treating human beings, because of the imperfect diagnosis, and the advantage of questioning patients was not satisfactory. It was said there was a difficulty in not being able to get a description of the symptoms from an animal. Very true, but it would not tell them any lies—(laughter)—and he was quite sure the veterinary practitioner was not placed in a worse position than others. He did not mean to say that patients wilfully told lies, but they kept things from their medical men. There was more difficulty in diagnosing this disease from the mere fact that the symptoms did not work out the same as in human subjects. He thought they were quite right in saying that physiology and pathology in veterinary science was not so advanced as in human science; therefore he thought, in discussing questions of this sort, the ratio of cases of diseases following bites presented great difficulty indeed, and they wanted elementary data. With reference to the discovery of M. Pasteur, all recognised it as being of great value, after his previous investigations, and, as Dr. Fleming very justly stated, they might very properly trust him on this occasion. But he could not help saying himself that, though he might be on the right tack, the question was at present *sub judice;* and there were not sufficient facts to justify their coming to one conclusion or the other. He quite admitted that M. Pasteur might be travelling in the right direction. He felt that Hydrophobia was a disease propagated by contagion, and he was quite convinced that if they put a muzzle on every dog for not twelve months, but six months, they would never hear any more of it. Another remark had been made as to experiments on animals for the purpose of deciding on cases of Hydrophobia, but he was afraid that if any practitioner tried to do this without a licence, he might find himself in a very difficult position. There were always some friends who would be almost ready to pursue them to the very death if they killed a flea!

(*To be continued.*)

LIVERPOOL VETERINARY MEDICAL ASSOCIATION.

The eighty-eighth quarterly meeting of the Liverpool Veterinary Medical Association was held in the upper library of the Medical Institute, Hope Street, Liverpool, on the 13th August, 1886, Mr. R. C. Edwards, M.R.C.V.S., Vice-President, in the chair.

There were present Messrs. Edwards, Storrar, Greaves, Woods, Whittle, Henry Sumner, Morgan, Pilkington, and the Secretary.

The notice convening the meeting having been read by the Secretary, the minutes of the previous meeting were read and confirmed.

Mr. GREAVES proposed and Mr. WOODS seconded, that the Secretary address a letter to Mr. W. A. Taylor, expressing, on the part of the Association, great regret that he had resigned his membership in the Association; that his absence from its meetings would be a distinct loss, and that he be earnestly requested to reconsider his decision and withdraw the resignation.

With regard to the note on the agenda relative to the President's resignation, Mr. STORRAR said the Association, as a body, was unanimous in the sincere feeling of regret that Mr. Faulkner had felt called upon to adopt such a course, and while he could not help saying that he considered the step uncalled for, by reason of the warm support accorded Mr. Faulkner by all the members, with a view to induce that gentleman to withdraw his resignation he would propose the following resolution:—That this Association holds Mr. Faulkner quite blameless as President of the Association, and in the conduct of its affairs, and earnestly requests him to withdraw his resignation and resume his position in the chair.

This proposition was seconded by Mr. WOODS, supported by Messrs. WHITTLE and GREAVES, and carried unanimously.

Mr. EDWARDS, the Vice-President, then waited upon Mr. Faulkner, who was in attendance, by special request of several members, in an adjoining room, and, having submitted the foregoing resolution, Mr. Faulkner returned with the Vice-President to the meeting, expressed his high appreciation of this proof of renewed confidence, and assumed his position as President in the chair.

The acceptance of the Secretary's resignation was then brought under discussion, in which every member present took part.

In the opinion of the meeting, the remarks offered by Mr. Morgan were considered equivalent to an expression of regret for having injured the Secretary's feelings with regard to matters referred to in previous minutes, and at the urgent solicitation of the oldest members of the Association, who assured Mr. Hurndall that the confidence of the members was unabated, he somewhat reluctantly consented to withdraw his resignation.

Referring to a letter received by the Secretary from Mr. Thomas Leather, of Liverpool, in which he tendered his resignation, Mr. STORRAR proposed and Mr. H. SUMNER seconded, that the Secretary be asked to write Mr. Leather, requesting him, in the interests of the Association, to reconsider his decision and withdraw his resignation.

The evening being far advanced, Mr. WOODS proposed, and Mr. EDWARDS seconded, that Mr. Greaves be asked to again defer the reading and consideration of his remarks upon Professor Walley's Paper until the next quarterly meeting.

Mr. GREAVES very kindly consented to this proposal.

Mr. WHITTLE proposed, and Mr. WOODS seconded, that the best thanks of the meeting be accorded to the President for occupying the chair.

J. SUTCLIFFE HURNDALL, *Hon. Sec.*

SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

(*Continued from page* 133.)

The hæmorrhage which proceeds from veins, no matter the volume of the vessels, the form or direction of their wounds, is dependent on the freedom of the circulation, for during violent muscular contractions which necessitate

the fixing of the thoracic walls and induce a kind of instantaneous pulmonary stasis, the flow of blood is more rapid than when respiration follows its normal rhythm. It is therefore well to remember this during operations, as the hæmostatic means employed during the animal's recumbent position, which may appear inadequate, are seen when the animal rises to be perfectly sufficient.

Arterial bleeding is characterised by a jet of bright red blood, rapid, jerky, and following in a very evident manner the rhythm of the cardiac contractions. The red colour of the blood is not constant, however, notably when the respiration is insufficient, or during an operation for which the animal has been put under the influence of chloroform. The projection of the blood is always very strong, the jet rapid, and the quantity of blood always rigorously in proportion to the size of the artery completely severed, or in proportion to the size of the opening made in it.

Contrary, however, to what occurs in veins, the hæmorrhage is more abundant in the case of a longitudinal incision than in that of a complete transverse section, no matter in what direction made, the reason for this being that the contractions of the artery, after the longitudinal incision, have the effect of opening the wound during each emission ; while in the case of the transverse section the effect of the contractions is to approximate the edges of the opening. Thus, in the latter case, the jet has never a volume proportionate to the diameter of the intact vessel. In the medium-sized or small vessels, situated in highly vascular tissues, the approximation may be so great and the friction which the blood meets with so intense that its emission may no longer be accompanied by pulsations. On the contrary, however, in such large blood-vessels as the aorta, the carotid, the femoral, etc., in which there is proportionately less muscular fibre, the contraction is but slightly marked, and the difference in the abundance and rapidity of the bleeding scarcely observable whether the vessel be cut longitudinally or transversely.

When the wound is made by a sharp instrument, things being equal, the flow of blood is much more rapid than when made by a blunt or rounded body, bruising and lacerating the arterial walls. In the latter case the breach made in the circulating apparatus is surrounded by a number of filaments, on which the blood coagulates and forms a multitude of obstructions, which break the stream, diminish its rapidity and volume, and may at any moment arrest it completely. Hæmorrhage from the large or middle-sized arterial trunks, no matter what kind of opening permits the escape of the vital fluid, rarely stops spontaneously. The greater the amount of blood lost in a given time, the slower the stream becomes ; but it usually only finally stops with the actual cessation of life. In small animals, however, such as the dog and cat, wounds to arteries of a considerable size are not always fatal, even when left to themselves. Trasbot has several times made experimental sections of the femoral of the dog, and only in one instance did death result. The subject was a large Newfoundland, and in it death supervened in about thirty-five minutes. In very small dogs, however, hæmostasia takes place readily. Trasbot made a simultaneous section of both femorals without producing death, but such was the anæmic condition produced that death took place a month later. The *post-mortem* was made, but no accidental disease had resulted. The loss from arteries such as the coccygeal and spermatic never result in immediate death, although they may induce an incurable anæmia. Simple excision of the testicle has been repeatedly performed, and in many instances has induced nothing more than an anæmia which somewhat retarded the animal's recovery. Cases of hæmorrhage from the spermatic, however, have occurred after almost every method of castration, and in some instances it has induced very serious

results. One case occurred to my father after the operation by torsion, in which secondary hæmorrhage commenced during the night, and when sent for early next morning he found the animal bleeding profusely. When cast it was found that a longitudinal rupture had taken place in the wall of the artery above its twisted extremity. A ligature was applied above the rupture, and the animal ultimately did well. In another case, in which he operated for a tumour situated over the false ribs, and where the largest artery was probably less in size than the spermatic, secondary hæmorrhage occurred, and the case being in Dumbartonshire, he did not get to it till the following day. He then found the hæmorrhage arrested, but the animal amaurotic. He gave his opinion that if the animal were fed on highly nutritious and easily digestible food that the optic nerves would regain their functions. But they did not.

When arterial hæmostasia is spontaneous it is to be accounted for by the diminished pressure within the vessels, the contraction of the vessels cut, and the coagulation of the blood in the wound. When the total mass of blood is considerably diminished the cardiac contractions do not prolong their impulse to the periphery, the circulating fluid does not distend the arteries nor exercise any eccentric pressure upon their walls, and thus allows the irritated vessels to contract upon themselves; the smaller the vessels the greater the contraction, as they possess more contractile tissue. Thus, as the impulse diminishes, the openings in the vessels by their approximation offer a greater amount of friction to the blood escaping, causing it to coagulate and form a temporary plug, which is ultimately transformed into a complete cicatrix.

The general symptoms by which hæmorrhage is accompanied are proportionate in their intensity to the relative diminution of the vital fluid. While in the case of section of the coratid the general symptoms may be observed within five minutes from the infliction of the lesion, from the opening of a smaller vessel, a capillary plexus, or a parenchymatous organ, thirty minutes may elapse without any general disturbance being apparent.

When any variety of hæmorrhage is sufficient to produce anæmic results the mucous membranes become pale, the pulse small, wiry; at first slower, but soon more rapid than normal; respiration becomes accelerated, then deep; the temperature of the body falls a little, particularly at the extremities; the animal appears anxious and uneasy. A little later profuse perspirations appear about the head, sides of the neck, shoulders, and particularly inside the thighs; respiration, very deep and difficult, now becomes extremely rapid, three or four times the normal number; the heart's action becomes tumultuous, sometimes intermitting more or less markedly; pulse imperceptible; mucous membranes almost perfectly white. The animal staggers, falls, rises with difficulty, only to fall again. The body is covered with cold perspirations, the eyes roll, face has a pinched expression, the muscles tremble and contract spasmodically, and the limbs move in a shaky and convulsive manner. The senses of sight and hearing are lost, excrements are expelled, and the general convulsions terminate only with the animal's death.

The subjects in which copious hæmorrhage is to be dreaded are the very young and the very old. Adult animals, otherwise healthy, will recover from an extraordinary loss of blood, the power of reproducing the blood-corpuscles being in them very much greater than in juvenile or senile animals.

Hæmostatics is the name given to the means and substances used for the arrest of hæmorrhage; they are divided, according to the time and duration of their action, into temporary or preventive and definite or curative. The first are used to arrest bleeding for the time being, and are principally had

recourse to during operations for the purpose of facilitating their execution. A consideration of those destined to definitely arrest hæmorrhage will be sufficient for the purpose of this paper. Their use demands a certain manipulative dexterity and rapidity of application, without which in many cases they will prove ineffectual.

Hæmostatics may be either physical, chemical, or surgical, according to the mode of action.

The physical are cold water or refrigerant combinations, snow, ice, nitrate of potash, with hypochlorate of ammonia and water. Cold water is applied in the form of compress, douche, spray, etc. Its most effectual application is in the form of spray. In passing through the air it is rendered colder by evaporation, and its light percussion on the skin has the effect of exciting the contraction of the small arteries and veins. It is by the stimulation of the vasomotor nerves, followed by the tonic contraction of the muscular fibres of the vessels, that the openings close and arrest the hæmorrhage under the refrigerating and percussing effect of the cold water, and the lower its temperature the better the result. Currents of cold air are also recommended, but the cold sprays are much more effectual.

Ether sprays, either by themselves or mixed with alcohol, cause in a few minutes by their evaporation the freezing of water, but applied to the tissues they are apt to bring about gangrene, and therefore can only be used with extreme caution.

The refrigerants are but feeble hæmostatics, and efficacious only in capillary or slow parenchymatous hæmorrhage, being quite useless in bleeding from erectile tissue, or from venous or arterial trunks. They are most useful in slight superficial bleeding or in that from the nasal mucous membrane, the mouth, vagina, or rectum. When employed over a large cutaneous surface for some time great care must be taken that the arrest of the natural perspiration and chill do not lead to more serious accidents than that for which the animal is being treated.

Tow, lint, sponge, spider webs, and farinaceous substances are all more or less employed. In veterinary practice the commonest and most useful of these substances is tow, either applied with compression superficially or by the plugging of the wound, as the case requires and circumstances will admit. Absorbents are, however, but feeble hæmostatics, and only useful for capillary hæmorrhage, except where it is possible to apply compression in conjunction with them.

Chemical hæmostatics are of two kinds—those which enter into combination with the blood cause its coagulation, and produce an astringent effect on the tissues, styptic and astringent ; and those which, by destroying the tissues and the organic fluids, form an eschar, caustics.

The astringents are very numerous, some of which are alum, oak bark, and all the substances containing tannic acid, salts of iron, copper and lead, alcohol, tinctures, essences, etc.

In hot weather the tannin preparations have, when mixed with the blood extravasated through the dressing, an antiseptic action which recommends their use. The most energetic styptic and astringent is the perchloride of iron, and must be used more or less concentrated, according to the surfaces to which it is intended to be applied. It acts, like all astringents, on the coats of the vessels, causing their most energetic contraction, and, besides, it forms almost instantaneously with the blood a firm and adherent clot. Soaked in a pledget of tow, and held for some moments to bleeding surfaces or fixed to them, it will arrest hæmorrhage of considerable extent. If at all indicated to mucous membranes it must, at any rate, be considerably diluted. Some practitioners administer it internally for hæmorrhage, either sthenic or asthenic in character ; but its action in this way is still problematical. It can

only be administered in small doses, and it is not certain that is absorbed. It is even probable that its action on the intestinal mucous membrane, which is the same as in wounds, opposes its absorption. It is, at all events, inferior to tannin, the hæmostatic effect of which internally has been proved by experiment and observation. Spirit of turpentine, both internally and externally, is used to a considerable extent, and with success.

The chemical agents, *i.e.* caustics, are little used except perhaps in France, where a fluid prepared by the addition of three parts of alcohol to one part of sulphuric acid, and called "Eau de Rabel," is sometimes employed as a caustic, but much more frequently in a less concentrated form as a styptic, and by some it is greatly valued. It is also given internally in many complaints as a styptic and astringent. The actual cautery is the oldest and perhaps even now the most frequently employed hæmostatic in veterinary practice, and it has certainly the advantage that no special knowledge is required for its application. Surgeons in remote times practised all their operations with knives heated to a white heat, and such practice is still said to be common among the Arabs.

For the application of the hot iron to have the desired effect all foreign bodies must be removed from the wound, a pledget of tow held to it until the iron is ready to be applied, for the blood by cooling the iron prevents the quick formation of the desired eschar. The iron should be applied at nearly a white heat, the wound being as dry as possible, and the iron removed before the temperature falls, otherwise the scar will adhere to the iron. If one iron is not sufficient several may be successively applied, each being removed while still bright red. Its use is, however, dangerous in the vicinity of joints or of cavities containing vital organs.

Such substances as feathers, the hairs of the mane and tail, and resin, etc., are said to be employed with advantage by burning them along with the tissues from which the hæmorrhage proceeds.

A large number of surgical operations for arresting hæmorrhage have not only been suggested, but practised, and although some benefit might be derived from their careful consideration, the trespass on your time has already been so much more than considerable that they will be but briefly referred to. The most important are acupressure, compression, plugging, the ligature and torsion. Acupressure is the most recent surgical operation for for the arrest of hæmorrhage, and was introduced by the late Sir James Simpson. Although it is a form of compression it deserves to be separately mentioned. Its aim is to compress the mouths of divided or bleeding arteries by pushing a needle through the tissues across the course of the artery, under or over it as the case may be, so as to cause pressure from the needle on one side and from the resisting tissues on the other, or by direct pressure of the needle on the under side of the artery and by counter pressure over it by a wire twisted round and lying parallel to the needle, the artery passing at right angles between. The great advantage claimed for this method is that the needle can be easily withdrawn and it is eminently surgical, expeditious, and efficient. The needle can also be withdrawn before it is long enough in the tissues to have set up irritation, and it is well known that the tissues will tolerate a metallic longer than an organic substance. It may usually be withdrawn within forty-eight hours after its application. A good deal has been said both for and against this mode of operating, and the fact that a number of our eminent surgeons continue to use the ligature where acupressure would seem to be indicated, is probably a convincing proof that it has its disadvantages, and these seem to be the occasional occurrence of secondary hæmorrhage, which in large amputations is always to be dreaded.

Compression has for object, like acupressure, the approximation of the

walls of the artery so as to suspend or facilitate operations, in some cases only to diminish the flow of blood through it.

Compression is described as direct, lateral, mediate, or immediate. Direct compression is effected by placing pledgets of tow into the bottom of the wound, placing a pad on the top, and fixing the whole according to the situation. Where bandaging is unsuitable various kinds of sutures are adopted. It is principally used after operations to the foot, withers, sides of the neck, and inguinal region.

Lateral compression is applied to longitudinal wounds of large vascular trunks, and may either be used to the vessel itself or to the region in which it is situated. In the first case it is immediate, in the second mediate.

Lateral immediate compression is effected by laying the skin open opposite the wound in the vessel and filling up the solution of continuity either with plain tow or with tow saturated in coagulating liquids, and approximating the edges of the wound over the two by means of tightly-drawn stitches. This method may be quite sufficient to stop bleeding from large arterial trunks.

Lateral mediate compression is exercised over, below and above the wound, with the aid of pledgets and bandages. In practising this method it is necessary to take in a large surface so as not to produce engorgements above and below the wound or part. It is of advantage in wounds to the lower part of the limbs, care being taken to bandage all the way between the foot and knee or hock.

Plugging is the introduction into wounds or natural cavities of spongy substances for the purpose of absorbing the blood and forming a compressive hæmostatic. It can be used to the nasal cavities, the womb, vagina, etc.

Like the other modes just referred to, it acts better when employed with styptics.

The ligature is perhaps until now the hæmostatic "par excellence."

It consists in embracing a vessel in a band capable of being drawn so tight as to permanently arrest the passage of blood. It necessitates primarily the dissection of the vessel, and if the wound be the lateral incision of an artery the ligature ought to be double, one being placed beyond either extremity of the wound.

In the case of the large venous trunks ligature of the peripheral extremity is usually sufficient.

Torsion is so frequently described in papers on castration that its description would be a useless encroachment on your time, and indeed the general details of the necessary surgical interference for the arrest of hæmorrhage would occupy a paper by themselves.

This, gentlemen, concludes my paper, and I thank you for your indulgent attention.

Professor Williams then vacated the chair, which was taken by Professor Lewis.

Mr. CUNNINGHAM proposed that the paper be published, and that the discussion be adjourned to the next meeting.

Mr. RUTHERFORD then related the case of a horse brought in from harrowing, which exhibited colicky pains and convulsive breathing, and which received a colic draught. Mr. Rutherford was then called in, and, in addition to the above symptoms, noticed that the mucous membranes were blanched, and the abdomen much enlarged, the owner observing that the enlargement had been increasing for some time back. When the head of the animal was raised, it fell. Diagnosis, internal hæmorrhage ; treatment, stimulants. Next day there were symptoms of brain anæmia, both eyes being amaurotic. Pulse 80 and weak, and appetite good.

Professor WALLEY, in seconding the adjournment of the discussion, inquired from Mr. Robinson what doses of Liq. Ferri. Perchlor. he would administer to horses in cases of hæmorrhage, and on Mr. Robinson replying that he would give half-ounce doses, Professor Walley stated that he would give ounce doses three times a day, and related having seen a hundred horses imported from Roumania, many of which had hæmorrhagic spots on various parts of the body, and concluded that these were due to parasites. The Professor also stated that a small collar or obliteration of a jugular will cause epistaxis, and that in sunstroke there frequently was hæmoptysis. He further stated that he was in the habit of using witch-hazel and puff-ball as a hæmostatic in purpura and hæmorrhage. In conclusion, he considered that the Secretary was remiss in not giving notice that specimens might be produced at the meeting.

The SECRETARY stated that the paper being to his knowledge exhaustive, he considered it inadvisable to overcrowd the members with subject-matter, and concluded to omit the request for specimens from the business notice, and also stated that it was an understood fact by all members that if they had specimens to exhibit, and chose to take their chance of obtaining time to exhibit them, the members were only too pleased to see them.

Professor WALLEY gave notice of motion that a reporter be paid for reporting the proceedings in full.

Mr. CUNNINGHAM thought there only should be a fair report, not a full one, as the journals felt overcrowded when very extensive reports were sent in.

Professor WALLEY considered that the Secretary should forward to each member a proof of his remarks for correction before publication.

Mr. RUTHERFORD suggested that if this were to be done, the Secretary should be paid, and the subscription raised to a guinea.

Mr. CUNNINGHAM was also of the opinion that the Secretary, being only honorary, had quite enough to do.

Professor LEWIS agreed with the remarks of Mr. Rutherford and Mr. Cunningham.

Mr. RUTHERFORD then gave notice of motion that the Society should name a subject, which subject should be discussed at consecutive meetings until exhausted.

After the usual vote of thanks, the meeting separated.

W. OWEN WILLIAMS, *Hon. Sec.*

ROYAL COUNTIES VETERINARY MEDICAL ASSOCIATION.

A MEETING of the above Association was held at Hungerford on the 13th day of July last, at the "Three Swans" Hotel. Previous to the business meeting, the members and visitors present were entertained to luncheon, at the close of which Mr. KIDD, who occupied the chair, gave the toast of the Queen and the Unity of the Empire, which was loyally drunk. Mr. SIMPSON (Maidenhead), in a few well-chosen sentences, gave the health of the chairman, Mr. Kidd, whose services as hon. sec. to the Association he described as invaluable, and as a mark of esteem he begged him to accept the model of a horse, which had been placed in the centre of the luncheon table. This model, which was a large one in bronze, was admired by the company as a correct representation of a hunter, and was executed by Mr. Jones, who is a sculptor as well as a veterinary surgeon. The toast was drunk with great enthusiasm.

Mr. KIDD briefly acknowledged the compliment, which he said was quite a surprise to him, for he never expected, when he saw the model placed on the table, that he would be its fortunate owner; his services did not merit such a handsome gift.

Mr. BARFORD then proposed the health of the President of the Associa-

tion, which was drunk with musical honours. The members then rose from the tables, and proceeded to transact the business of the Association, Jas. F. Simpson, Esq., in the chair.

The minutes of the meeting at Reading in February last having been read by the hon. secretary, were confirmed.

The PRESIDENT announced that Mr. Simpson, of Windsor, whom the Association decided to support, was placed at the head of the list of councillors, and he regretted he was unable to be present to acknowledge the compliment in person.

The SECRETARY then read a long list of apologies for inability to be present, and then the following new members were elected: Mr. T. Bennett Goodall, M.R.C.V.S., proposed by Mr. Flanagan, seconded by Mr. Barford; Mr. Charles Nicholson Carter, M.R.C.V.S., Guildford, proposed by Mr. Wheatley, seconded by Mr. Barford; Mr. Edward Montague Davy, M.R.C.V.S., London, proposed by Mr. Wheatley, seconded by Mr. Flanagan.

On the motion of Mr. BARFORD, seconded by Mr. FLANAGAN, Didcot was selected as the next meeting place, to take place the last Friday in November.

Mr. BARFORD acknowledged the compliment done him by this and kindred Societies in the South of England in returning him as a member of the Council, and trusted that the interests of the profession would not suffer at his hands. (Hear, hear.)

The HON. SECRETARY gave notice that at next meeting he should move a resolution, to the effect that the Association considers the advisability of presenting a window in the Council Room of the Royal College of Veterinary Surgeons. (Hear, hear.)

Mr. RAYMOND then moved that his paper be taken as read, adding: Since this paper was written some fresh material has been added to this branch of science by the labours of Professor Johne and of Drs. Loeffler and Schütz. You will notice that on page 17 I refer to the discovery by Johne of Actinomyses in the spermatic cords of horses after castration. Continuing his investigations, Professor Johne finds that connective-tissue tumours are sometimes caused by Actinomyses. I now beg to refer you to page 9 to the Micrococcus suis. You see that some scientists assert that Typhoid is caused by a micrococcus; others that it is caused by a bacillus. In recent papers published in Germany, 1885, Messrs. Loeffler and Schütz (the discoverers of the bacillus of Glanders) have published some investigations upon Swine Fever which may interest you, and I will, therefore, say a few words on the subject. Drs. Loeffler and Schütz seem to prove beyond doubt that what is called Swine Fever (*Rothlauf*) in Germany is caused by a bacillus similar to the bacillus of Mouse Septicæmia, but Dr. Loeffler, in one case, found no bacillus resembling Mouse Septicæmia, but a minute ovoid bacterium, resembling Pasteur's figure of 3 microbe. It is suggested that under one heading two diseases may have hitherto been classified: one a Septicæmia, resembling in its case the Septicæmia of mice, and the other caused by a minute ovoid bacterium similar to Pasteur's figure of 8 microbe. Now, gentlemen, you have very great experience of this disease. I wish, therefore, to ask you to add one more question to the three already submitted to you: Have you noticed, in your practice, anything which at any time has led you to suspect that you were dealing with two diseases, sufficiently alike to be called Typhoid, yet showing dissimilarity in certain symptoms and *post-mortem* appearances?

"BACTERIOLOGY FROM A VETERINARY POINT OF VIEW."

Mr. President and Gentlemen,—The subject I have the honour to bring before you is one which is somewhat neglected by members not only of our

own, but of the medical profession. Gentlemen in active practice have rarely the leisure to investigate for themselves new doctrines until those doctrines have become more or less established facts. Bacteria have now been proved to be the cause of so many diseases that it is no longer possible for professional men to remain without at least some knowledge of these minute fungi. I took up the subject some time ago in consequence of being connected with several outbreaks of Anthrax. I knew very little of the subject, but even that little enabled me to deal so much more effectually with my cases that I was persuaded that bacteriology was a branch of study which no veterinary surgeon could afford to neglect altogether.

I found considerable difficulty in grasping the subject, partly on account of the want of classification, partly on account of the many technicalities employed, the meaning of which is, to say the least, very obscure to the uninitiated.

Since then several new books on bacteria have appeared, including new theories and new classifications ; but my object will be to put before you not so much new theories, which are liable to be demolished at any moment, as the actual main facts which appear at present to have a more stable existence.

We daily read of the discovery of a microbe, supposed to be the cause of some disease. Professor Lustig recently discovered no less than six different kinds in the nasal discharges of a horse suffering from Influenza. But his conclusions must be accepted with reserve until supported by the testimony of more than one scientist. For as Koch has pointed out, in 1883, in his work on "Splenic Fever Inoculation," in no instance can these theories be accepted until they are satisfactorily proved to be true, and in no instance can a micro-organism be said to produce a disease until—

1st. The micro-organism in question is found to be present in the blood or tissues of the patient alive or dead.

2nd. It is necessary to take these organisms when found, and to cultivate them artificially in suitable media outside the animal body, but by such methods as to exclude the accidental introduction into the media of other micro-organisms, and to go on cultivating from one cultivation to another for several successive generations in order to obtain them free from every kind of matter derived from the animal body, from which they were taken in the first instance.

3rd. After which it is necessary to re-introduce them into the body of a healthy animal susceptible to the disease, and in this way show that this animal becomes affected with the same disease as the one from which the organisms were originally derived.

4th. And, finally, it is necessary that in this animal the same micro-organisms should be again found.

A particular micro-organism may probably be the cause of a particular disease ; but that really and unmistakably it is so can only be inferred with certainty when every one of these desiderata has been satisfied.

I have thought it necessary to state the above, because, although many utterly pooh-pooh bacteriological knowledge, others seem to think that when a microbe is discovered it must necessarily be the cause of the disease from which the animal is suffering at the time.

Many of my hearers may have felt a desire to make themselves acquainted with the subject, but owing to the want of time necessary to gain preliminary information, have been unable to follow their inclinations.

This difficulty fell also to my lot. My first trouble was to know the difference between a micrococcus and a bacillus ; and, failing to understand the foundation of most of the papers I read, I became more puzzled as I proceeded.

I therefore propose to give a short sketch of the classification of bacteria, illustrated with some specimens seen under microscopes and some drawings with which a friend has been so kind as to furnish me ; after which I will, with your permission, give a short description of some of the microbes in which we, as veterinary surgeons, are more particularly interested.

The class of fungi with which we are about to deal are the Schizo-mycetes, or splitting-fungi [from *schizo*, I cleave ; *mukes*, fungus].

A final classification has not yet been made, but the latest is Zopf's, a rather complicated one. Klein, one of our greatest English authorities, has adopted Cohn's classification, which is roughly as follows :—

1. *Micrococci*, or *Sphero-bacteria.*
2. *Bacteria*, or *Micro-bacteria.*
3. *Bacilli*, or *Desmo-bacteria.*
4. *Spirilli*, or *Spiro-bacteria.*

There are also various kinds which approach one or the other of these—*e.g.*, ascococcus, sarcina, leptothrix, cladothrix, streptothrix, etc. I shall limit my descriptions to those which interest us mostly as veterinary surgeons.

I will now describe these fungi—

Sphero-bacteria, or *Micrococcus*, are colourless, or very palely tinted, round or oval, motionless cells dividing in one direction only. The daughter cells, *i.e.*, the offspring of the division, either soon separate from one another or remain united in a chain of two (Dumb-bells, Dipplococcus) or more ; (Tetrades, Sarcina) or form a mass of colonies (Zoogloœa). All micrococci multiply by slightly elongating and then dividing by transverse constriction into two (Dumb-bells). True micrococci never form rods.

Some micrococci only grow in the presence of oxygen (the air), they are called ærobic. Others do not require free oxygen ; these are classed anærobic. There is a marked distinction between different species. The micrococci occurring in connection with disease are anærobic.

Micrococci may be divided according to their chemical and physiological functions into—

a. Septic.
b. Zymogenic.
c. Chromogenic.
d. Pathogenic.

a. Septic Micrococci occur with other septic bacteria whenever there is decomposition of organic matter in solids or in fluids. They are constantly found in the air, and in man and animals ; in fact, wherever there is dead tissue, in which they grow well and copiously. They are found in ordinary pus. (Ogston.)

b. Zymogenic Micrococci are associated with definite chemical processes ; for instance, the Micrococcus Ureæ.

c. Chromogenic Micrococci, which form pigment of various colours, such as the Micrococcus prodigeosus and fulvus.

d. Pathogenic Micrococci.—Most of these are connected with disease. They are to be found in the pus of open wounds (Cheyne), in closed abscesses, Typhoid Fever, Tuberculosis, Swine Fever, Pleuro-pneumonia in cattle. Pasteur and others assert that Swine Fever is produced by a micrococcus, which Klein denies.

The following micrococci stand in intimate connection to specific diseases.

We have the *Micrococci variolæ et vaccinia.* Chauveau was the first to prove experimentally that in vaccinia and in variola the active principle is a particulate non-diffusible substance. Burdon Sanderson and Cohn, Weigert and Klein, have confirmed him and carried his investigations farther. But in accordance with the principles laid down at the beginning of this

paper, it must be remembered that it has not been proved that the micrococci are the *causa morbi*, for the disease has not yet been successfully reproduced after cultivation.

The Micrococcus of Pleuro-pneumonia.—Bruylands and Verriers (*Bull. de l'Acad. Belg.*, 1880) assert they have successfully cultivated the micrococci of Pleuro-pneumonia of cattle.

More recently, T. Poels and Dr. W. Nolen, in Rotterdam (*Centralbl. f.o. Med. Wiss.*, No. 9, 1884), assert they have ascertained in Pleuro-pneumonia of cattle that the pulmonary exudations contain micrococci, which in their morphology and mode of growth in artificial cultures are identical with the micrococci of human Pneumonia. And they further assert that artificial cultures of the micrococci derived from either human Pneumonia or from Pleuro-pneumonia of cattle, produce, in cattle, the typical Pleuro-pneumonia. Klein, from his observations, has reason to doubt the accuracy of these statements.

The Micrococci of Cattle Plague.—In Cattle Plague, micrococci have been found in the lymphatic glands by Klebs (1872) and by Summer in the blood and lymphatic glands (1874 and 1881). In conjunction with Archangelski, Summer cultivated the micrococci obtained from the lymphatic glands of a sheep dead of inoculated Cattle Plague in several media, such as broth, etc. The micrococci grew very copiously as zooglœa and chains. With the micrococci (of a first transfer) a calf was inoculated, and died seven days afterwards of Rinderpest. The cultures, when transferred, lose gradually their virulence from one generation to another, but animals (sheep) inoculated with them are protected against further virulent disease. Cold destroys the activity of Rinderpest organisms. However, it appears that the specific nature of these micrococci cannot yet be considered absolutely established.

Micrococcus Suis.—The cause of Swine Plague is found in couples—dipplococci and tetrades. I have not had an opportunity of seeing it, but gather my description from a recent paper by Dr. Fleming. Klein has described a bacterium as being the cause, but Pasteur, Cornevin, and Dr. Salmon are against him. According to Pasteur and Salmon, protective inoculation has satisfactory results.

The *micrococcus of Erysipelas* has been demonstrated to be undoubtedly the cause of that disease. Fehleisen has employed these germs therapeutically by inoculating persons suffering from Lupus, Cancer, and Sarcoma with them, and with good results to the patients. I have reason to believe that Erysipelas in equines is infectious.

Of the *Chromogenic Micrococci*, the following is of interest to us :—

The *Micrococcus Fulvus*, found on horse's dung. The cells at first form a rusty, conical, tolerably firm drop, which increases in size, and finally produce gelatinous masses.

Zymogenic Micrococci.—The Micrococcus Ureæ is the only one of this species of any interest to us. It is found isolated, or forms zooglœa on the surface of the fluid. It is the cause of ammoniacal fermentation, changing urea into carbonate of ammonia.

Bacteria, or *Micro-bacteria* (Cohn), are slightly elongated and oval, or short and cylindrical, with rounded ends. They divide by fission, like micrococci. They are capable of spontaneous motion, being possessed of a flagellum at one or both ends, with which they perform active spinning and darting movements. Occasionally, after division, several remain connected, thereby forming a short chain. They also form zooglœa.

Amongst those likely to interest us most are :—

1. *Septic Bacteria*, divided into the Bacteria Termo and Bacteria Lineola. They are the essential cause of decomposition of putrefying fluids.

2. *Zymogenic Bacteria* comprise, amongst others, the Bacteria Lactis

which Lister has demonstrated to be the cause of lactic fermentation, *i.e.*, the souring of milk.

3. *Chromogenic Bacteria*, which include the Bacteria Xanthinum, which produces yellow milk ; the Bacteria Syncyanum, which produces blue milk ; and the Bacteria Œraginosum, found in so-called green or blue pus.

Bacilli, or *Desmo-bacteria*, are cylindrical or rod-shaped bacteria, which are rounded or square at their extremities. They sometimes grow into chains or filaments, which are called leptothrix.

Some bacilli are endowed with a flagellum, and are capable of spontaneous movements ; others are not. To this motile class belong most of those micro-organisms with which we have to do. The bacillus of Anthrax forms an exception.

One of the most striking phenomena in the growth of bacilli is their power of forming spores. These are generally oval when fully developed, spherical when immature ; they are always of a bright, glistening appearance, and take dyes with difficulty, or not at all. They are generally a little thicker than the bacillus within which they develop.

For the development of spores free access of air is essential.

Spores with access to nourishing material develop into bacilli ; for this purpose free air is not required.

Anthrax bacilli do not form spores at a temperature below 12°C. (Koch), nor above 40°C. (Pasteur). Spores are tenacious of life to an extraordinary degree ; long lapse of time, drying, heat, cold, chemical agents, etc., have no effect upon them. If passed rapidly through alkalies and acids, such as caustic potash and sulphuric acid, they remain uninjured ; ethers and alcohols likewise do not injure them at once (Tyndall). A lengthened residence in such fluids will, however, destroy them. Neither great heat nor great cold kill them, unless brought to bear for a long time. The reasons given for their great tenacity of life are, first, that fluids take some time to moisten them, and they are provided with two coats, one external, composed probably of cellulose, and an inner coat of a fatty nature, both bad conductors of heat. Besides, one can easily imagine that by age the outer parts of the spore might become so desiccated that some time is required to soften it sufficiently to render it subject to the influence of boiling water. As a fact, it is found that the spores of Bacillus Anthracis take half an hour's boiling to kill them ; some spores do not require so much, others more.

Zymogenic Bacillus.—The bacillus subtilis, or hay bacillus, is found largely in the air and on hay.

Professor Williams has stated that an outbreak of Anthrax was caused by animals eating this bacillus, which he suggested became pathogenic and caused the disease. Professor Axe considers this view to be erroneous.

The bacillus butyricus causes fermentation of butyric acid in old milk and ripening cheese. Cellulose is decomposed by it, and hence the great importance of the bacillus in the digestive process of herbivorous animals, in whose stomach and intestine it is very common. It is very common in all substances containing starch.

The Septic Bacilli.—The bacillus septicus occurs in earth, putrid blood, and many putrid albuminous fluids ; it is also occasionally found in the blood of man and animals after death, but it cannot subsist in a nourishing fluid which contains micrococci, bacillo termi, or bacilli subtilis.

Chromogenic Bacilli.—The bacillus syncyanus (Neelsen) causes the blue colour in milk after it has become acid.

Pathogenic Bacilli.—The bacilli of Choleraic Diarrhœa from meat poisoning caused the death of four people out of seventy-two, attacked after eating meat sandwiches at Welbeck, Notts, in July, 1880. Again, in February, 1881, fifteen persons were attacked at Nottingham, after eating baked pork.

One case ended fatally. Experiments on dogs, etc., etc., after cultivation, resulted in the death of the animals.

The bacillus of Ulcerative Stomatitis in the calf. In the *Lancet* of May, 1883, A. Lingard and E. Bolt described a peculiar bacillus found in Ulcerations on the tongue and buccal mucous membrane of the calf.

The bacillus of Glanders. Schütz and Löffler, in the *Deutsche Med. Wochenschrift*, No. 52, for 1882, discovered bacilli in the nodules found in horses dead or dying of Glanders. The bacilli are very minute, being about the size of a Tubercle bacillus. These bacilli were carefully cultivated for several generations, and inoculated into a horse, rabbits, guinea-pigs, and mice, all of which took the disease, particularly the guinea-pigs. On the site of the subcutaneous inoculation appears an ulcer with indurated base, speedily enlarging and spreading; other ulcers follow in the neighbourhood, the neighbouring glands become swollen, and general infection follows in the form of nodules and ulcers on the septum nasi. In all these cases the diseased tissues contain the characteristic bacilli. N P. Wassilief, in the *Deutsche Med. Wochenschrift*, observed the bacillus in human Glanders.

(To be continued.)

NORFOLK AND EASTERN COUNTIES VETERINARY MEDICAL ASSOCIATION.

THE seventeenth half-yearly meeting of the above Society was held on July 14th, at the Bell Hotel, Norwich.

Present:—G. A. Banham, Esq., F.R.C.V.S., President, Cambridge, in the chair; J. Hammond, M.R.C.V.S., Bale, Vice-President; W. Shipley, M.R.C.V.S., Yarmouth, Vice-President; A. H. Santy, F.R.C.V.S., Norwich, Vice-President; Professor Pritchard, London, Hon. Associate; J. D. Overed, M.R.C.V.S., Blofield; S. Smith, M.R.C.V.S., Lowestoft; T. E. Auger, M.R.C.V.S., Wymondham; W. L. Fenner, M.R.C.V.S., Clare, Suffolk; F. W. Wragg, F.R.C.V.S., London; G. C. Hunting, M.R.C.V.S., Stalham; R. S. Barcham, Hon. Secretary.

Visitors:—T. Greaves, F.R.C.V.S., Manchester; L. Butters, M.R.C.V.S., Liverpool; A. S. Auger, M.R.C.V.S., Saxmundham; —. Coe, New Zealand; J. B. Martin, M.R.C.V.S., Rochester; C. Waters, Esq., Postwick; C. H. J. Bray, M.R.C.V.S., Norwich; W. Shipley (student), Yarmouth.

The minutes of the last meeting having been taken as read, Mr. SANTY read apologies from several members of the profession, also from officers and members of the Royal Agricultural Society, England, regretting their inability to be present, owing to their engagements on the show ground.

The PRESIDENT then gave his inaugural address:—

GENTLEMEN,—My first, as well as my most pleasant duty, is to bid hearty welcome to those gentlemen who have so kindly honoured us with their presence here to-day.

Veterinary science is of unquestioned importance to the agriculturist, and your attendance here is a gratifying proof that the fact meets with your recognition.

In the second place, I wish to thank the members most sincerely for again electing me to the honourable post of President of this Society. It is with the greatest possible pleasure that I accept this honour; at the same time I should like to impress upon the members that a change of officers is advantageous to the welfare of societies. Such changes impart new life and vigour to them, and checks any tendency that might otherwise show itself to run in the same groove. Another thing: those who are continually re-elected to serve in the same office are apt to become self-satisfied, and to think that all is being done that can be for our advancement; the

enthusiasm of novelty wears off, however we may try to stimulate it into renewed vigour. In order that I may not drift into any such lethargy as this in carrying out my duties for this year, I must appeal to you, gentlemen, yourselves to show enthusiasm in the cause, and, if possible, to infect your President with it.

Although it is the rule for the President to address the members at the annual meeting, it is not easy to discover an appropriate subject for such an address on this occasion. You would not thank me to bother you at such a gathering as this with the politics of our profession; still less with a high-flown scientific discourse, which, though interesting to the members of the profession, would probably be beyond the comprehension of many who are now here. Therefore I have chosen to say a few words upon a subject which has received the attention of all of us at some time or other of our professional career, but more particularly that through which many others, as well as myself, are now passing—viz., that of early professional life, and our first attempts to win the confidence of, and learn the customs of, the general public. I will, therefore, ask you to permit me to direct your thoughts somewhat in the direction that my own have been forced into during the last five years.

When veterinary surgeons commence practice, they are brought in contact with various grades of the community who keep domestic animals for one purpose or another, and with individuals whose occupation it is to attend upon them, as well as those whose trade it is to supply them to those who want them.

Owners.

Although almost every owner of horses would, if asked, say that he takes an interest in his animals, yet it is very surprising to the young practitioner of veterinary medicine to find the indifference a large number of them exhibit during sickness among their animals. The veterinary surgeon frequently attends the animals of certain stables for years, without even knowing, or even having an opportunity of conversing with the owner at all. In other cases, when he does enjoy such advantages, he often finds that the owner has some new remedy to ask the veterinary's opinion about, that Mr. So-and-so has recommended him to try. Not unfrequently, however, owners are less frank than this, and whilst the veterinary attendant is administering one remedy the owner is trying another. Not only so, but they invariably permit anybody to see the case and give their opinion about it; and some will even obtain the views of a second practitioner without telling him the case is already under treatment by another. Such practices as these on the part of the owner have often caused differences to arise between two practitioners, which remained during the whole of their professional life.

Grooms, etc.

The most difficult persons, however, the young practitioner has to deal with are coachmen, grooms, and stablemen. He soon finds that this class of men consider themselves competent to give information, not only as to the general stable management of the animals under their care, but also upon the modes and methods of shoeing, and even upon their treatment during disease.

A great number of these individuals use certain drugs which they believe are calculated to give a good appearance to the animal, with the simple object of thereby saving themselves the trouble of grooming them. Others are fond of the various nostrums now in the market to suit all maladies—the so-called "cure-alls." The former of these are absolutely dangerous, as many of the drugs used are deadly poisons, and not a few animals are killed annually by allowing grooms to use them. The latter medicines are only dangerous inasmuch as the administrator does not know what he is giving;

and, moreover, no medicament can be concocted to suit all the ailments domestic animals are heir to.

Not only does the veterinary surgeon find himself face to face with this difficulty with these men, but there is another, far worse, both to the practitioner and the owner—I mean the system now in vogue of "*tipping*." It is a known fact that in London the grooms actually expect a percentage of the account any tradesman may have against their employer, and this pernicious practice is spreading to the country. I don't suppose there is a practitioner who has not been asked what he gives as percentage on the bill. Now, what is the effect of this? Why, first that the percentage has to be charged the master in the bill. In other words, the tradesman puts his hand in his client's pocket to pay the servant. Or still plainer, the servant uses the tradesman to rob his master. Now, suppose the young practitioner refuses to comply with the servant's wish; the latter will soon complain of something he does to his master; the latter trusts his groom, and does not trouble to make inquiries of the practitioner, and the consequence is the veterinary attendant loses a client. Even if this does not happen, the groom treats the practitioner with such an amount of incivility that it is very unpleasant for him to go to the stable, and should he have a case that really requires any nursing from the groom, it won't get it. The consequence is the animal is lost, and a good opportunity is at hand for the groom to find substantial fault. In fact, the man makes it what he terms "hot for the vet.," and manages to do it successfully, and without committing himself in the eyes of his employer.

Advertised Medicines.

The next lion in the path of the young practitioner is the advertised medicine used not only by grooms, but by owners themselves. In nearly every case we are called in to treat at the present day, we find that some unknown agent or other has been administered.

Now what is the result of this? Why, that we have to work in the dark. When we ask the owner what he has given, he invariably answers, "One of So-and-so's draughts, but I do not know what it is made of." I am fully convinced that I have lost more than one case by administering medicines after such agents as these had been given, which, had I have had the opportunity of learning the nature of, I should not have given at all. The action of the medicines I have used, under such circumstances, have been so different from their ordinary and recognised action, that, when I am now called in to a case where these agents have been used, I am really afraid to give anything that has any action at all, and prefer to leave more to the "vis medicatrix naturæ" than would be otherwise advisable.

Existing Practitioners.

There is now an additional drawback the young practitioner has to encounter, and that is, the opposition and effrontery from the "existing practitioners," some of whom, I believe—in fact, I know—are respectable, honest, hard-working men, always endeavouring to do their best for the animals they are called upon to treat, and are in every way worthy of registration. But can this be said of the majority of them? a large number of whom are blacksmiths, others dealers, others pig-jobbers, and castrators, etc.; in fact, they are composed of nearly every grade of man about animals—men whom we have not a word to say against as such, neither should we so long as they even practised under their true title. But do they? I can confidently say no. One had even the audacity to tell me that he had been up to London and passed the College, and got his qualification; and most of them inform their customers, grooms, and everybody they come in contact with, "that they have passed the London College, *and have as good a qualification as any*

other veterinary surgeon." Although both these epithets may be true, inasmuch as each and all of them may have passed by the outside of the Royal College of Veterinary Surgeons when going through Red Lion Square, and each of them has as good a *legal* right to practise veterinary medicine and surgery as any member of the R.C.V.S., still I think you will all agree with me such sayings are false and misleading, because they are uttered with a view of making the general public believe that they have studied and passed the required examination prescribed by the R.C.V.S., just as its members have. This trickery and deception is what we complain of, for although these "existing practitioners," as they are legally styled, may use the title "Veterinary Surgeon," yet they hold no certificate; neither have they passed any examination, nor have they been educated at any veterinary college.

Illegal Practitioners.

Not only is the young practitioner handicapped by these legal practitioners, but by many other illegal ones, and among the foremost of these are *the officers of the Society for the Prevention of Cruelty to Animals*, who use their official post for this purpose. I do not think the Society should permit this practice, because they are essentially a humane society, and I do not think these officers are carrying out this principle when they undertake to treat animals suffering from diseases they are wholly unqualified to cope with.

Dealers.

Then we are brought in contact with those individuals who trade in horses —"dealers." What do they think of the veterinary surgeon? In what other light can they regard him other than in that of an obstructor in their business? He it is who has to step in between the buyer and seller, and has to point out to the former all the defects he can find the animal possesses. Naturally, then, dealers look upon "vets." as most disagreeable and dangerous persons to them. Nevertheless, gentlemen, we have this duty to perform, and I trust we shall always carry out that duty with honesty to our employers, justice to the dealers, and in a spirit which professional men should invariably cultivate, viz., that of the strictest impartiality. Now, nearly all business men and others give dealers a bad name, but, I think, unjustly, for I have often said that I would rather trust them (as a class) than I would some other branches of trade, *e.g.*, builders. I would sooner give a dealer £100 to purchase me a horse than I would give a builder £100 to build me a shed, for I firmly believe the former would give me better value for my money than would the latter. Yet the one walks about as an honest man following a respectable calling, whilst the other is invariably looked upon as a rogue following a dishonest calling, which I think is unfair.

You will learn from these remarks that I do not think "dealers" are worse than their neighbours, yet they are very dangerous men to the young practitioner of veterinary medicine. And why? Because there are few of them who will not offer bribes to the innocent young practitioner in order to get him to give a certificate of "soundness" falsely. Few of us in this room, I will venture to say, there are who have not had such bribes offered them, not only by "dealers," but by so-called "gentlemen" too. Now what is the result if the young "vet." refuses to be tempted? Why, the "nefarious trader" "crabs," as he would term it, the practice of the veterinary surgeon, and, should another customer ask the dealer where he should go to get the horse examined, he would tell him the name of the one that answered his purpose best, *i.e.*, he whom he could rely upon to get the most favourable certificate from.

Not only does it tell against the young practitioner with the "dealer," "farmer," or "gentleman," himself, but he often goes out of his way to inform all his friends "that So-and-so is a bad practitioner, and knows no more about horses or his business than an old woman." They rarely stop here, but add

other tales to substantiate the falsehood they are trying to set afloat. Some of you present will doubtless say that such men can do the young practitioner no harm, *but this is not true, for I know they can and do.* The men the veterinary surgeon has to do with are horse-owners, breeders, and horsemen generally, and this class of men do take notice of what dealers and such men say, and they even take notice of their grooms on such matters, perhaps even more than many of us imagine; and it is not generally known to beginners in veterinary practice, nor to the public, what an amount of mischief these evil-disposed men can and do inflict on individual members of our profession.

Gentlemen, I could say much more on these and similar incidents from the reminiscences of my five years' practice amongst the British public, but I must not detain you much longer, as I know you are anxious to hear Professor Pritchard. I must, however, ask you to give me your attention for a few more minutes, so that I may point out some of the remedies for these evils.

Firstly, then, I would ask the owners of animals to give a little more personal attention to their animals, especially when they are unwell. Always converse with the veterinary surgeon himself, and not leave your servants to carry messages and orders between us, which frequently causes misunderstanding and false interpretations. Do not ask another practitioner's opinion about cases that are already being treated by a qualified man. Never allow your groom to administer drugs or compositions of their own to your animals under any circumstances, nor medicines of any kind without your own direct knowledge and approval.

Should your groom find fault always satisfy yourselves from a personal interview with the veterinary surgeon of the circumstances of the case, and make sure it is not due to the groom's not getting sufficient out of the transaction, before being impressed with it.

Do not use advertised medicines, because you do not know what you are doing, nor can you inform the veterinary surgeon what has been done, should you find it necessary to call in his assistance. Rather use some simple remedies of your own prescribing, which you can describe to the veterinary attendant if necessary. Although even this procedure requires more attention than it sometimes receives. It is not long since I was asked to see three horses which had died suddenly. Upon inquiry, we found the man had given them what most of you would consider a simple medicine, viz., *sulphur;* but it had been administered in too large doses, and had poisoned the horses, and made several others very seriously ill. This shows how important it is that the doses and actions of the drugs used should be known to the amateur before he uses them. However, as this is nearly impossible for ordinary persons to grasp, it is far more safe, convenient, and advantageous to yourselves, the patient, and medical attendant, to keep a stock of remedies suitable for the more common ailments of animals by them, to use in cases when you do not think it sufficiently urgent to call in veterinary aid. *Such remedies should be obtained from your regular veterinary attendant;* then, in case you require his assistance, you can inform him that you have given one of his so-and-so draughts, bails, or what not, and he will at once know how to proceed without fear or hesitation.

In all cases where owners undertake the treatment of animals in disease, it is imperative that they should interpret the signs of ill-health correctly, before they apply any remedies at all. When the owner has the slightest doubt as to the cause of illness he should at once consult the veterinary surgeon, for if aid is of any use at all in a serious illness, it is during the early stages. Moreover, if the owner can't read the symptoms it is quite certain he can't select a remedy; for it is far easier for a cute observer to distinguish the malady than it is to select the remedy.

Therefore I would impress upon all those who do not obtain their medi-

cines from their regular attendant to do so at once, for I am sure you will find it advantageous in every way; and, I believe, most practitioners will supply such medicines to their regular clients at the same prices as they can be obtained elsewhere, especially during these times of agricultural depression.

Should a dealer or seller of horses tell you that Mr. So-and-so shall not examine his horses, always refuse to buy them, for you may be sure that in ninety-nine cases out of 100 it is because the dealer can't "*square*" him, therefore that is the very man you require to have advice from.

Always put the registered practitioners in their proper place when they tell you "they have passed the College and are qualified to practise." Never employ them for easy cases, and give the difficult ones to educated practitioners. This treatment is not fair, and if you are not aware of it, perhaps I may be allowed to draw your attention to the fact, that you can cope with such cases yourselves quite as well as, and perhaps a little better than, they can.

It has often been a matter of great surprise to myself to find gentlemen and farmers of no mean general educational attainments trusting their valuable stock to the mercies of these persons, who have not the slightest knowledge of disease in general, much less its special forms; neither have they the remotest idea of the actions of medicines, nor of their uses in special cases. And even if they do by chance "spot" the malady the poor animal is suffering from, and select one of their empirical remedies, they have not the brain-power to reason out the case during its progress and follow it up with suitable medicaments; because, if you take the majority of the "existing practitioners," you will find them to be the most illiterate, uneducated, inferior type of persons. And when one thinks of it, we can't imagine how educated men can entrust their animals—worth, perhaps, £200 or more—in such hands as these. We often think they would be far better off to use their own trained thinking powers and reason for themselves in such cases, for I have frequently been called in after these empirics, and found the nostrums they have used have done more harm than the malady itself. Moreover, Members of the Royal College of Veterinary Surgeons should be encouraged by the public, after spending so much money and time, and taking the trouble to make themselves as proficient in their art as the education afforded by the English nation permits. Not only do individual practitioners require this encouragement, but also the profession itself.

Gentlemen, I must apologise for detaining you so long upon these points, but I have only done so because I am convinced that they ought to be known and recognised more than they are; if this were the case, the path of the veterinary surgeon's early life would be much more smooth, and the public would reap the benefit. I say the *young practitioner*, because the same liberties are not taken with the older and fully-established ones, and even if they are they can successfully oppose them, or even afford to take no notice of them at all.

Veterinary surgeons are often looked upon as an unscientific and unlearned class, and perhaps in past years there has been some justification for this view; but considering the great drawbacks we have to contend with in the comparative paucity of educational opportunities, and in the absence of all endowments for veterinary research, the profession has undoubtedly made great progress of late years. With the encouragement of the public, and a little assistance from the Treasury, much more could be done, for few know better than ourselves how much remains for us to do.

Professor PRITCHARD having spoken in high terms of praise of the address, proposed that Mr. Banham be asked to permit it to be published in an agricultural as well as a veterinary journal.

The meeting having unanimously agreed, the President kindly gave his consent.

(*To be continued.*)

CENTRAL VETERINARY MEDICAL SOCIETY.

A MEETING was held on the 3rd June at the First Avenue Hotel, Holborn. Present—twelve Fellows, including the President, Mr. F. W. Wragg.

After routine business and election of new Fellows, an essay was read by Mr. SIDNEY VILLAR on "The Common Parasites of the Domestic Animals." The subject was very ably treated, both from a scientific and practical point of view, and evoked great interest.

The PRESIDENT expressed the pleasure he had felt in listening to the paper, and invited discussion of the subject.

Mr. BROAD said he perfectly agreed with the essayist that no parasite could arise *de novo;* in each case the larva or ovum must be brought. Yet in some animals, or rather, in some states of their system, there was a predisposing condition which favoured the development of the parasites. With regard to the question of the essayist as to lumbricoid worms in the horse, he had found tartar emetic useful.

Mr. TEGG asked why the *Filariæ bronchialis* so especially troubled young stock? Also in what proportions the ingredients mentioned by the essayist were used for inter-tracheal injection?

Mr. ROWE said he feared that the subject of intestinal worms had not always attracted its due share of attention. A cause of Tapeworm in the dog was, he considered probable, their baiting rats and ingesting the larval cysts so frequently to be found in the livers of those rodents. He did not find that the presence of worms, even in large numbers, always produced a poor, unthrifty condition of the bearer of them.

Mr. HASSELL thought that the allusion of Mr. Rowe to rats had little bearing on the pathology of canine parasitism, for experiments had proved that the larval forms in the rat's liver would attain development in the intestines of the cat only. The hydatid he alluded to was well known as the proscolex of a tapeworm peculiar to the cat.

Mr. GIBBINGS said he had lately tried one of the various advertised worm medicines for dogs, and was surprised at the quantity of worms evacuated. He believed the powder, in common with others of the kind, contained areca nuts.

Mr. ELWORTHY gave instances of the rapid and energetic action of areca nut in causing the expulsion of tapeworms.

Mr. SAMSON also asked for the proportions of the mixture of carbolic acid, chloroform, and turpentine. He had found carbolic acid and chlorine gas useful in treating calves and lambs for "Husk." As a remedy for lumbricoid worms in horses, he preferred sulphate of iron. He thought that its highly styptic taste was the cause of its efficacy. No agent, he believed, would expel bots. With regard to the small red worms which affected colts, he thought that veterinary assistance was not sought early enough, the animals being found very poor and exhausted. He recommended small doses of turpentine, gentian, and sulphate of iron, with abundance of good food. He had never known a case of this kind occur on pastures where there was a gravelly soil, but they were prevalent in low-lying districts. He agreed with Mr. Rowe that worms may be found in very young animals. He had seen them an inch long in puppies two days old.

Mr. HASSELL said the rate of development of lumbricoid worms in dogs had never been thoroughly investigated, but it was believed to be exceedingly rapid. He had found worms, sexually mature, in enormous numbers in young dogs three weeks old, and many worms had reached the length of five and six inches. He would not, however, endorse the idea that puppies could be born with worms in their intestines. The origin and course of most parasites was now known; Menlikoff's experiments had shown that the Tænia Cucamerina of the dog was derived from a parasitic form in the

louse of the dog ; possibly, he said, the louse of the rat harboured parasites which might produce other forms in the dog. The Filariæ bronchialis have been found in their intermediate forms on the blades of grass in pastures where animals affected with Husk had been fed ; it was therefore concluded that the first remedy was to remove the animals to another pasture or place. Intertracheal injection might then be tried, though whether the entozoa were killed by the medicaments or die in the ordinary course was difficult to say. He was of opinion that the Filariæ lived but a short time. An ordinarily severe winter would, he said, destroy all the forms of the parasite which rendered a pasture infective. It had been asked why young stock especially suffered; his opinion was that young and old harboured the parasite in a greater or less degree, but that the young showed more evidence of its presence and suffered more, just as they would less easily than older animals endure the administration of any strong drug.

Mr. OTWAY said a client of his had a stack of hay three years old, which had been put up in a very wet season ; he had about fifty beasts, and, after they had been fed upon this hay for about six weeks, every one of them became attacked with Husk. No improvement occurred till the hay was kept away ; some of the old animals died, the younger ones recovered.—In answer to questions from Mr. Hassell, he said that he had not discovered any embryonic forms of the parasite on the hay. The beasts were kept entirely in yards. The water supply was brought by pipes from the Colne Valley Works.

Mr. HASSELL said the embryos were not difficult to find. If Filariæ were taken from an affected animal's lungs, put upon a piece of dry earth, and then stood in water, at the end of a certain time—he would say about a week, the ova would be developed, and if the water containing the ova were then put upon grass, and an examination of the grass were afterwards made with an inch-power microscope, the embryonic Filariæ would be seen ; they were about a fortieth of an inch in length.

Mr. VILLAR replied to the various statements and to questions which had been asked. For intertracheal injection he mixed equal parts of carbolic acid and chloroform with two parts of turpentine ; he injected from thirty to sixty minims in an undiluted condition. ALFRED BROAD, Hon. Sec.

BORDER COUNTIES VETERINARY MEDICAL SOCIETY.

THE eighth meeting of this Society was held at the George Hotel, Penrith, on July 9th, Mr. Thompson presiding.

There were also present :—Mr. J. Donald, Secretary ; Professor Lewis, Edinburgh ; Mr. Coates, Brampton ; Mr. Pears, Mr. Young, Cockermouth ; Mr. Robson, Mr. Tallentire, Skelton ; Mr. Armstrong, Mr. Carlisle, Carlisle ; Mr. E. Grierson, Penrith ; Mr. Kendal, Barrow ; Mr. Greaves, Manchester ; Mr. Walker, Kirkby Lonsdale ; Mr. Harrison, Warcop ; Mr. Bell, Carlisle ; Mr. Roberts, Kendal.

The minutes of the last meeting having been read and confirmed,

The CHAIRMAN thanked the members very sincerely for the kind letter of condolence which was sent from the last meeting, under the melancholy circumstances in which he had been placed. He looked upon it with feelings of pleasure and sadness, and the pangs of pain were partly soothed when he thought of the kind feelings which prompted them to send that letter.

The SECRETARY proposed that an ecraseur, a set of trephine instruments, and Thompson's tooth shears be purchased for the use of members. He explained that they were very useful instruments, and if the members clubbed together they could be purchased without difficulty. It was what other Societies were doing.

Mr. BELL seconded the motion, which was supported by Professor LEWIS and Mr. GREAVES, and carried after a short discussion.

On the motion of Mr. BELL, seconded by Mr. HARRISON, a small committee, consisting of the President, Secretary, Mr. Roberts, and Mr. Bell, was appointed to select and purchase the instruments named, and to draw up a code of rules for their loan by the Society.

On the proposition of the SECRETARY, seconded by Mr. TALLENTIRE, Mr. Hoadley was elected a member of the Society.

The SECRETARY said he should like to ask whether it was in order for any member to comment on the unpublished proceedings of the Society. He referred to a letter published in the JOURNAL, for April, signed "M.R.C.V.S.," which undoubtedly referred to certain remarks which fell from Professor Williams at the last meeting, and should like to take the opinion of the meeting as to whether it was in order for any member to make such comments; he did not wish to introduce any acrimony into the meeting, nor did he wish that any member should be accused of writing the letter; he only wanted the feeling of the meeting on the matter; and if it was against such a course—as he thought it would be—it might prevent such an occurrence in the future. If it was understood that it was unbecoming to comment on the unpublished proceedings of the Society, he did not think they would hear more of it.

Mr. BELL said he was astonished to see the letter in the JOURNAL, and thought it a breach of confidence on the part of the writer; whether he was present as a visitor or member, it was a most unjustifiable course for him to take. It was a very delicate matter, indeed, that any gentleman should be attacked in the manner their friend, Professor Williams, was attacked on that occasion, and he was very glad that Mr. Donald had raised the point. It was cowardly for any man to write such a letter anonymously, and attack him behind his back.

The CHAIRMAN said he certainly felt very keenly on the subject, seeing that he was chairman at the dinner. When he saw the letter signed "M.R.C.V.S.," and another signed by the initials of the writer's degree as a Fellow, he thought it was very cowardly, and likely to bring discord amongst the members of their society. He thought the feeling of the meeting condemned the letters.

Mr. GREAVES said he had read the article, which certainly struck him as very unjustifiable. It was unEnglish and ungentlemanly, and he condemned it as strongly as any one.

The CHAIRMAN asked if it would be necessary to have a motion before the meeting.

Messrs. ROBERTS, TALLENTIRE, and HARRISON said they were unaware that anything of the sort had occurred; but they would join in any action discountenancing such proceedings.

The SECRETARY thought it would meet the case to enter it on the minutes.

On the suggestion of Mr. BELL, supported by Mr. ROBERTS, it was decided that the Secretary should write to Professor Williams, stating that the subject had been under discussion, and that the members strongly condemned the action of the writer in making such a cowardly attack upon him.

The CHAIRMAN stated that Mr. Mackintosh had promised to give them a paper on "The Present Position of Members of the Veterinary Profession"; but he was unable to do so at the present time, and Professor Lewis had kindly consented to read them a paper instead. The subject he had selected, "Abortion in Cows," was a most important one. He believed in trying to find out the causes of diseases; he believed there were many causes of Abortion, and if they could find them out they would do more for the benefit of England than all the Tories and Whigs put together. (Laughter.)

Professor LEWIS then read a very interesting paper on "Abortion in Cows," in which he dwelt at considerable length on its causation. The views he favoured most were: First, Fungus-affected Foods, as principally Ergot and Smut; second, Contagion. To the latter cause he thought attention ought more particularly to be directed, as being capable of satisfactorily explaining many of the outbreaks.

The CHAIRMAN said they were all much obliged to Professor Lewis, and he hoped they would have a good discussion.

Mr. HARRISON said Professor Lewis had given them a good many causes of Abortion, and so far as his experience went he had generally found that one case of Abortion was followed by others. When they had a case of Abortion in a byre the best thing was to remove the animal and use a quantity of disinfectants. He put a wineglassful of carbolic acid in a pailful of water, and every time the animals were cleaned out the byreman threw the fluid on the genitals of the animals. He thought the food had a great deal to do with Abortion; there were more cases of Abortion where artificial food was used than when the cattle were fed on natural food. He should like to have the opinion of the meeting as to whether ensilage was a properly-cured food, and whether it would be likely to have a detrimental effect on animals in a pregnant state. He had not a great opinion of ensilage on the whole, and thought it was an unnatural food for animals. Accidents often caused Abortions, which once started became almost like a habit.

Mr. GREAVES was very much pleased with the manner in which the subject had been handled. He had not much experience amongst cattle. There was one thing in which he differed from Professor Lewis. Whenever he had been called in to attend a case of this kind he did not remove the diseased animal; he left it in the byre and removed the others. He put the sound beasts in a fresh place, made a complete change in their food and water, and put them anywhere rather than in the shippen where the cow had aborted. He believe much depended upon sympathy. There was a peculiar, mysterious virus that was felt, and sickened the other animals that breathed it. It was a mysterious influence, and possibly sympathy had more to do with it than actual contact with any poisonous matter.

Mr. ROBERTS said it had been well remarked that that was a great question for country practitioners, but it no less concerned them all. Cases of Abortion presented themselves to the country practitioner with alarming frequency, causing him a great amount of annoyance and trouble. It frequently happened that cattle which were least wanted to do it were most subject to Abortion. About eight or nine years ago it was very common in their district, and it was perhaps a couple of years afterwards that the theory of contagion was promulgated. Since then they had had what might be called the endemic form of the disease, all the country-side being affected with it. All that time he thought it was due to the impoverished condition of the cattle and the bad sanitary condition of the buildings. He strongly urged the necessity of better buildings, loose-boxes, and sanatoriums, so that animals when diseased or aborted might be separated from the rest of the herd, and in that way try to nip the outbreak of the disease in the bud. He was still of opinion that that had a great deal to do with it. At the time he was speaking of the cattle in his district were exceedingly short of fodder, and what was secured was in bad condition, very mouldy. A great many young heifers running on through the winter had nothing but oat-straw and a large quantity of turnips. The consequence was that they got in poor condition and aborted one after another, causing a great loss to the farmers. During the same spring a great number of ewes aborted, also from the watery character of their food. There was another thing which pointed very much to the theory of contagion. Very often when cattle of

any kind aborted they were sent to the market, as soon as they were cleansed, and sold, and, on being placed in another person's shippen there, carried disease into a fresh herd, and so the disease was spread over the whole country. He did not think they could too strongly urge the carrying out of improved sanitary arrangements, though it was often difficult to do so on account of the state of the architecture. When a cow had aborted, his practice was to remove it, and also, if possible, the fœtal membranes, and wash out the uterus with a solution of perchloride of mercury (1 in 1,000) in water. In that way, and by burning membranes of the aborted calf, he destroyed the scent of the infected matter, and he found that was a capital thing for preventing the spread of further Abortion. He had seen a number of cases arising from the use of antiseptic sheep-dip, lice-wash, and that sort of thing. They had thirty-one animals poisoned with a solution of tobacco; a good many of the animals aborted within a fortnight. Quite recently eleven animals were poisoned with arsenious acid—ten died, and one aborted within a fortnight. His opinion of silage was of the highest order, both as a milk and flesh producer; it was also a saver of food and of labour in bad seasons.

Mr. BELL said the remarks of previous speakers accorded very much with his own practice; he found that abortion was caused by such a various number of things that they could scarcely put their finger on the mysterious element already mentioned. For three successive years one of his clients had scarcely a cow on his place but what aborted. Everything was thought of—sympathy, contagion, the poor condition of the hay, which was got in wet weather, and also the water. He suggested that a sample of the water should be sent up for analysis, and at last it was examined, when it was found that it was impregnated with sewage matter from the manure. That was immediately altered, and they had never had but an occasional case since. If they could only find out a means of preventing Abortion they would do a great amount of good to the stockholders of the country.

Mr. PEARS (Penrith) thought the bull was sometimes to blame, especially in those cases which occurred in the early stages of pregnancy.

Mr. CARLISLE considered that there was a good deal in Mr. Pears' statement. On many occasions Abortion had been traced to the bull, and it was his opinion that it was hereditary to a great extent. It was a very difficult thing to remedy, but the first thing to do was to find out the cause; when they had found out the cause they would not have much difficulty in finding a cure. The causes were very numerous; and sometimes Abortion occurred which they could not trace to any cause; sometimes they would see a lot of fine, healthy cattle, and one would commence, and then others would follow; the mischief was done before they could remove the first animal, and, as soon as they found out the first, there were several others ready to do it. There were symptoms for days before Abortion occurred—redness, enlargements of the gland, and so on. If the mischief had got into the system they could not prevent it, though they could remove the animal and treat it to a milk dose of medicine. He did not believe the fault was in the food, the cake, or the ergotised grain. He still considered that the principal cause was ill ventilation and bad sanitary arrangements. Discharged matter would lay in holes for days, the air became contaminated by it, and cows, perhaps fifteen or twenty in the same byre, breathed the same air over and over again. He thought people should be compelled to keep their byres clean, and that they should have inspectors for them, as they had for many other things. He thought such an inspector would be of great benefit to agriculturists, but the landlord ought to provide proper buildings. He had not had much experience of ensilage, but a friend of his said he considered it a great cause of skin-disease. Others used it extensively, and seemed to do very well with it.

Mr. BELL said at one time he was very much opposed to ensilage, believing that it produced Abortion, but he was very glad to say that that opinion had been entirely altered. He had seen ensilage used for several seasons with the greatest benefit to stock. Generally speaking he had found ensilage a very excellent food indeed, and stock had done remarkably well upon it.

Mr. ROBERTS said they had twelve or fifteen silos in their part, and landlords and farmers had gone in for them very largely, but he had never heard of it producing either skin diseases or Abortion. He had never heard anything but the best reports of its fattening and milking properties. One thing he did hear, but he was not disposed to think that it was caused by ensilage, and that was that it gave a sour or stinking quality to the milk. Several cases had occurred where ensilage was used; sometimes a cow calved, and then gave milk which stank; but he attributed it to defective digestion, and on giving medicine it was cured.

Mr. PEARS (Langholme), said he had often thought that one cause of Abortion was the retention of the fœtal membranes. As to ensilage, he could not say that he had thought much about it; his mind was not favourably impressed with it, but it was only on theoretical grounds. He thought they could not raise animals of such strong constitutions as if they were fed with hay, etc., and he knew that the sourness of milk and also of the butter was greatly complained of.

Mr. TALLENTIRE said sympathetic action was an important factor in the production of Abortion. He had seen it in one place where the whole of the animals had aborted with only one exception. He mentioned a case where most of the animals in a pedigree stock for three years in succession aborted. There were 105 head of cattle; the byre was well drained and ventilated, though it had a barn above nine feet higher than the cattle. In another herd of 115 they had no such thing as Abortion. The buildings were open to the slates, and there were as many as forty head in one byre. There were drains underneath. He had noticed the effect of sympathetic action many a time, and unless they got a cow out as soon as they observed symptoms of Abortion they had no chance. He had a great antipathy to mouldy cake, which should never be used; in his opinion, that had caused Abortion many a time. Bad food was one of the things which was very liable to cause Abortion. If there was more crushed corn and beans used and less cake they would have much heavier stock.

Mr. HARRISON said it frequently happened outside in summer time, so that, as a rule, they could not attribute it then to bad sanitary arrangements. There must be some specific thing at work more than had yet been brought out.

The CHAIRMAN said the primary case might originate in the byre.

Mr. DONALD said in his opinion ergot would not produce Abortion in the first five months of pregnancy, and he did not think it had any effect on the uterus in the early months of pregnancy—at least, he had not been able to produce it. It was the opinion of their late friend, Mr. John Thompson, that tincture of aconite was a great cause. He had seen one or two cases in mares after treatment of aconite, but he could not say whether it was due to that cause or not. With regard to ergot and smut in grass, it is reported that animals suffer from dry gangrene without producing Abortion.

The CHAIRMAN made a humorous reference to the cattle-keeping of Jacob three or four thousand years ago, and to his knowledge of the means of preventing Abortion, from which he inferred that Abortion was known in the earliest times. He thought the condition of the male animal was very important. The late John Blackstock had told him that the use of mangolds had a great deal to do with producing Abortion. Mangolds were generally kept until the turnips were done, and used between the time of grass and fodder.

In large quantity it had a peculiar action on the system both of cattle and sheep. It induced the formation of a crystal of ammonia magnesium phosphate, and sometimes he had taken a large quantity of these crystals from the end of the sheath of the male animal. It was quite possible for that to be transmitted to another animal to impregnate the ova and then cause Abortion. They ought not to feed the male animal with mangold-wurtzel, particularly if they were grown with super-phosphates, which put too much acid into the land. He thought it must have some action on the generative organs and the breeding propensities of the animals. When a man rented a farm he generally bought cows at different places and in various stages of gestation; they were all put together, and then if one aborted all the others followed. There was a peculiar sickly smell arising from the aborted matter, which was taken up by the olfactory nerves of the other cows, and through a reflex action produced Abortion in them. They might call it sympathetic action. If they had a cow suffering from Blain and bled it, they would have it abort in a fortnight. ("No, no," from several members.) He had seen it frequently. As to the use of aconite, he did not use that drug to pregnant animals; in his opinion it would produce it. The state of the buildings, the size, ventilation, and drainage had a great effect in causing or preventing Abortion. As to the prevention of it, he thought every farmer ought to have a couple of nursery boxes, and immediately a cow showed symptoms of calving, whether at or before the full time, should be put into one of the boxes. He did not think it was right that a cow should calve in a byre where there were other cows, probably in a pregnant state. One remedy he had to suggest—it might seem a very curious one—was that a goat should be kept along with the cows. It was a natural disinfectant, stronger than carbolic acid.

Mr. CARLISLE, Mr. BELL and Mr. DONALD all said they had seen it occur when he-goats were kept with the breeding cows.

The CHAIRMAN said as to the bad smell and taste of the milk, he had found it was often due to the use of nitrate of soda an the land.

Mr. HARRISON said he had seen farms where the animals had been fed largely with treacle mixed up with chop, and they had great difficulty in getting the animals to conceive at all, and when they did conceive they frequently aborted. He supposed the mangold contained a large proportion of saccharine matter.

Mr. BELL said he had seen the same effects from a mixture of heated and partly fermented chop, which was used by some stockowners.

A vote of thanks to the essayist was proposed by Mr. BELL, and seconded by Mr. PEARS, and carried unanimously.

Professor LEWIS briefly acknowledged the compliment, and commented on a few points which had been raised in the discussion.

A variety of instruments, appliances, and preparations were on view.

Mr. Roberts, Kendal, showed several instruments of improved construction, amongst which was a useful set of neat, handy, nested trocars and canulas and his chloroform bag.

Professor Walley sent a box of instruments, mostly constructed from his own patterns.

Krohne and Sesemann lent a large display of all the newest and most approved instruments—an excellent collection of well-finished instruments.

The President exhibited a drug-mill and a mixing machine, both shown at work. The mixing machine was strongly recommended as an efficient labour-saving implement, and was much admired by the members. The drug-mill ensured the advantage of pure freshly-ground drugs, not at all times obtainable in the ground condition.

The Secretary showed three samples of cheap cream-like turpentine lini-

ments, a disguised turpentine mixture, a caustic for Foot Rot, Aloes mass, etc., and several new drugs and preparations. Also samples of prepared shoes for roughing horses, showing the advantages of self-fastening cogs.

After the meeting the members, through the kindness and hospitality of Messrs. Robson and Pears, were entertained to an excellent knife-and-fork tea at the hotel. J. DONALD, *Secretary.*

ROYAL AGRICULTURAL SOCIETY.

AT the Monthly Council Meeting, held on August 4th, Sir John Thorold (Chairman) stated that Professors Brown and Robertson had reported that no case of disease had appeared in the Norwich show-yard.

Professor Robertson had presented his report upon his visit to M. Pasteur, as follows :—

Report of Visit to the Laboratories of M. Pasteur at Paris.

In compliance with the desire of the Council of the Royal Agricultural Society, and in accordance with arrangements made, I, in company with another teacher of the Royal Veterinary College, visited the experimental and manufacturing laboratories of M. Pasteur, with the object of acquiring such practical knowledge of the method there adopted for the preparation of vaccines—attenuated viruses—of certain specific diseases affecting the animals of the farm, and the modes of employing these, as would enable us to prepare and use them in this country.

Furnished with letters of introduction, we arrived in Paris on June 20th, and on the following morning we called on M. Pasteur, who received us in a courteous and kindly manner, introducing us to the directors of his laboratories, Drs. Chamberland and Roux, under whose direction we were placed during our sojourn, which, in my own case, extended to ten days, my colleague, Mr. Penberthy, remaining a week longer.

It may be well here to note that the two specific diseases of stock which so far have received the largest amount of experimental investigation under the direction of M. Pasteur, and for which protective vaccines have been found, are, 1, "Anthrax," *i.e.*, Splenic Fever of cattle and sheep; 2, "Rouget du porc," a disease of swine, said to be identical with "Swine Fever" of Great Britain. The disease known in this country as "Quarter-ill," or "Blackleg symptomatic Anthrax," has not received a like consideration from M. Pasteur. It has, however, at the hands of MM. Arloing, Cornevin, and Thomas, of the Lyons Veterinary School, been experimentally investigated, and for its prevention it is stated a protective vaccine has been discovered.

In our last conversation with MM. Pasteur and Chamberland, it was stated that the work connected with Anthrax had now passed out of the department of experimentation, and that the ability to prepare a "protective vaccine," which is the term given to the prepared virus, was an accomplished fact; that the use of this was regularly resorted to over large areas of France, and that the practice was steadily increasing.

Since the first public demonstration of the efficacy of protective inoculation for Anthrax in fifty sheep at Pouilly-le-fort, near Melun, in 1881, the number of vaccinations had gradually increased, until the returns for the first four months of the present year show that there had been sent to the provinces of France and other countries, vaccine sufficient to inoculate 153,125 animals. We were also informed that the results of this vaccination were highly favourable, as shown by the altered rate of mortality in districts where this method has been adopted, the deaths from Anthrax in cattle having dropped from fifty to one, and in sheep from fifteen to one.

Although a knowledge of the principles on which the present system of protective vaccination are based has been very broadly disseminated, it may

not be out of place here to briefly state the most generally held views on the subject. In connection with many contagious and specific diseases of animals, certain microscopic organisms of a vegetable nature have been demonstrated, and experiments tend to prove that if these be not the actual cause of the disease, they bear some definite relation to it; so close a relation that the disease never exists without their presence in the blood or tissues of the affected. In each of the separate diseases to which reference has been made, there is an organism of virus which is special to each disease, and which may by microscopic, chemical, or vital manifestations be differentiated from the virus of any other disease.

These organisms are capable of growing and multiplying in suitable media, and under favourable conditions of temperature, etc., outside the animal body This process artificially carried out is termed cultivation. Without entering into the details of how any micro-organism is proved to be the cause of any particular disease, we may state that the capacity of the virus to produce the full or fatal effects of the disease may be modified by certain circumstances; that is to say, by treatment outside the body the virus may be rendered capable of inducing only a mild form of the affection (attenuated); or this power may be intensified by other forms of treatment. On grounds which experience has proved secure it is held that the introduction into the body of a virus capable of giving rise to a mild form of the disease secures the animal so treated for a longer or shorter period from the fatal effects of the more powerful virus. This protective virus Pasteur calls a "vaccine." As ordinarily carried out in France, protective inoculation is accomplished by the use of two "vaccines" known as first and second. The latter, much more powerful than the former, is employed within fourteen days after the weaker.

To meet the demands upon the laboratory work for the supply of anthrax vaccine, the preparation of this is now carried out in an establishment apart from the experimental laboratory in connection with the Ecole Normale, where it was originally started. In the Rue Vaquelin, under the charge of educated assistants, M. Chamberland carries out the preparation on a large scale—the necessity for this being apparent when regard is had to the statement of the quantity demanded for France and other countries. In this manufacturing laboratory, on the ground floor are arranged the larger apparatus for making the bouillon or meat liquor, and stoves for the sterilisation previous to its being sown with the organisms which induce the disease. Here, too, are stoves in which the sowings are subjected to certain definite degrees of heat, in order to produce the required attenuation; and apparatus for the filtration of water for special purposes. The rooms above include the hot chamber, in which a certain temperature is maintained. Here the broth is tested after its sterilisation, and the different sowings and vaccines are kept for definite periods. In another apartment the decanting of flasks and filling of tubes with the vaccine is carried out, while close by these is a store for broth, etc.

So true and correct has the preparation of this vaccine been maintained that for four years no fresh importation of anthrax material has been required.

To satisfy our interrogations, and to give us familiarity with manipulatory details, a rabbit was placed at our disposal for inoculation with virulent vaccine, *i.e.*, the virus of Anthrax, which has the power of inducing the fatal effects of the disease if inoculated into a healthy animal. This gave us an opportunity of actually carrying out the preparation of the protective material from the starting-point of the process, which we continued to do under the superintendence of our instructors as long as we remained. From this series of cultivations the impregnated bouillon is carried through the various stages, "il the production of what is known as first and second vaccine. These

two degrees of strength, it must be understood, are those invariably employed at present in securing in the animals operated on, immunity from either artificially induced or naturally occurring Anthrax. The obtaining of a proper first and second vaccine for the double inoculation of all animals to be protected, although secured by time, a properly regulated temperature, and the action of oxygen, can only be determined exactly by direct trial upon living animals. The proof by experiment is alone sufficient and satisfactory. M. Chamberland emphasised this, particularly remarking that its non-recognition and strict carrying into execution he regarded as the chief cause of what failures had been reported where the Pasteurian method of preventive inoculation had been attempted. Without entering further into details which, in this report would be unnecessary, I would only desire to state that the perfect regularity and exactness with which all details relating to the manufacture of this vaccine, from the first preparation of the bouillon to the filling of the tubes which are to transport it, impress the conviction upon the mind of even the uninitiated that all is directed upon the recognition of some fixed principle or idea, and with the view of attaining some definite object.

The same general principles and regulation of details in force in the preparation of the vaccine employed as a protective against Anthrax regulate the manufacture of that which is used as a prophylactic for "Rouget." With the latter, however, the modification of the virus is more generally effected by passage through rabbits than through the stove, although it was stated that this same end could be attained by either method. The proper attenuation of this virus, like that of Anthrax, is arrived at by means of experiments on living animals. And, as in the latter disease, a first and second vaccine is said to be requisite.

In the consideration of this part of the subject it will be necessary to have regard to the fact that, while there can be no doubt as to the identity of Charbon or Anthrax of France and Splenic Fever of Britain, it has not yet been so clearly demonstrated that "Swine Fever" and "Rouget" are identical. To determine their identity or differentiation seems to us absolutely necessary before we presume to reason from analogy.

Summary.—The two diseases for which a protective vaccine is provided by M. Pasteur, are "Anthrax" or "Splenic Fever" and "Rouget."

That the thoroughly careful and scientific method of procedure in the laboratory, the exactness in preparing, and implicit faith in the potency of the preparations, all warranted and supported by experiment and statistics, indicate their adoption where prevention of either of the diseases is deemed necessary.

That it is highly essential, in order to provide protective inoculation for animals in any country, that the virulence and prophylactic property of the vaccine be proved by experiment on living animals.

That in the event of the Society deciding to give a trial to this method of protective inoculation in Great Britain, it will be a matter for consideration, as to Anthrax, whether it be economical, having regard to the comparatively small fatality from the disease, to use the virus prepared by Pasteur and imported direct, or to have it prepared in the Society's laboratory here, always bearing in mind that it is absolutely necessary to test the strength of the virus, whether prepared abroad or at home, by direct experiment.

That the preparation and practical use of the vaccine can be carried out in England.

That before any further steps be taken respecting providing a protective vaccine for Swine Fever on the lines carried out by M. Pasteur, the identity or non-identity of Rouget and it be proved. This question, I believe, is now under the consideration of the Agricultural Department of the Privy Council, and I hope we shall shortly be in a position to form a definite opinion on the subject.

That we accord our thanks and gratitude to MM. Pasteur, Chamberland, Roux, and the laboratory workers for the courteous and ample assistance which they yielded us in the attainment of the objects in view.

Appended is a table of statistics procured from M. Pasteur's business agent, showing the number of animals vaccinated and the rate of mortality. This table shows results corroborating the figures mentioned in the body of the report, and which were the estimate given by M. Chamberland in conversations which we had with him.

PREVENTIVE VACCINATIONS AGAINST ANTHRAX, ROUGET, AND FOWL CHOLERA.

	Anthrax.			*Rouget.*	*Fowl Cholera.*
Date.	Horses.	Cattle.	Sheep.	Swine.	Fowls.
1881	242	7,231	74,550	None.	None.
1882	2,029	41,823	306,870	None.	None.
1883	1,346	32,230	353,330	3,216	700
1884	384	40,500	361,198	5,371	3,160
1885	1,298	41,982	401,625	13,269	4,620
1886 to Apl. 30.	No figures given.	20,541	132,584	6,966	2,230

Since the first annual reports of the veterinary surgeons on the results of the vaccinations, the rate of mortality in Anthrax, amongst animals preventively vaccinated, has fallen to from two to five per thousand as compared with a rate of mortality of from 100 to 250 per thousand, which obtained previous to the introduction of the system into these localities.

The Committee recommended that a sum not exceeding £100 be allotted from their annual grant to Professor Robertson to enable him to carry out experiments with the virus of Anthrax and of Quarter-ill, and that a sum of £50 be granted to Professor Brown for further experiments on the lung-worm in cattle and sheep.

This report was adopted.

In reply to Mr. WELLS, Professor BROWN said that a great number of outbreaks of Swine Fever had occurred in the West Riding of Yorkshire and in Lancashire. The county to which Mr. Wells referred, Huntingdonshire, took a very high place on the list ; the returns yesterday showing that there was in one small place an outbreak affecting one hundred animals, and in another over one hundred, and it seemed very probable that the disease would extend from these centres. As the matter now stood, the Privy Council had felt themselves compelled to abandon the severe legislation which they had recently adopted, in consequence of the orders being either ignored or imperfectly carried out by some local authorities. At one time the Privy Council had prohibited the holding of swine markets, and if the order could have been carried into effect it would have restricted the dissemination of the disease. With regard to the compulsory slaughter of diseased animals, and of those in contact with them, or in the same shed, etc., there was no doubt that had the order been properly carried out the number of cases would have decreased, instead of increasing, as was now the case. Instead of slaughtering all the swine in the same shed as the diseased animals, the local authorities seemed to have exercised their ingenuity in trying how little they could do towards the extirpation of the infection. The matter had recently engaged the attention of the Privy Council, and after a lengthened discussion, it was decided that this sort of legislation in the present state of public feeling was impracticable. The local authority might now slaughter diseased animals and those

in contact with the infection; they might stop the sale of swine or allow it under restrictions; they might prohibit the movement of swine, and under certain restrictions every local authority would have power to protect its particular district from the infection of any other district. After the unsatisfactory result of the recent legislation, he (Professor Brown) did not feel disposed to recommend the Privy Council to take any further steps at present. He did not doubt that Swine Fever could be stamped out when people made up their minds that it ought to be done, and he would instance, as an example, the case of the Cattle Plague, and he supposed they must wait till public opinion was sufficiently advanced to render it possible to do something to stamp out the disease before they could hope to be successful.

The PRESIDENT thought, after what had fallen from Professor Brown, that the Council would like to know what steps were proposed to be taken on the part of the Agricultural Department with regard to ascertaining how far the French "Rouget" was identical with the Swine Fever of Great Britain.

Professor BROWN said that he proposed to obtain some of the virus of "Rouget" from France, inoculate some pigs here, and then compare the results. At the present moment their evidence was to the effect that each disease had quite a distinct microbe, one being a fine long thread-like filament, while in Swine Fever it consisted of two small circles joined together like the figure 8. Dr. Salmon had obtained some of the virus, and had found both organisms. Experiments with the anthrax virus had been undertaken by Dr. Sanderson and Mr. Duguid, and Dr. Klein had also made experiments with this virus. The first thing in the "Rouget" and "Swine Fever" experiment would be to decide whether or not the two diseases were identical, which he doubted, and then ascertain by an extended inquiry whether or not we had both diseases in this country. This would involve a considerable outlay of money, because, if we had both Swine Fever and Rouget among us, it would require two sets of experiments to protect the animals. In addition, these investigations would demand time and most delicate manipulation.

Army Veterinary Department.

IT having been decided that, unless circumstances will not admit of it, Inspecting Veterinary Surgeons will remain at a station for three years, while serving in the United Kingdom; the following changes will consequently take place on October 1st. I.V.S. J. J. Meyrick, C.B., leaves the War Office and relieves I.V.S. W. B. Walters, Dublin; the latter takes up the duty at Aldershot from I.V.S. J. Lambert, who goes to the War Office.

Obituary.

IT is with deep regret that we record the death of one of the oldest members of the veterinary profession, and certainly one of the most estimable, sympathetic, and lovable of any who have ever entered its ranks. John William Gloag, F.R.C.V.S., on the retired list of the Army, and veterinary surgeon to the Royal Irish Constabulary, died at his residence, Blackhall Street, Dublin, on July 20th, aged seventy-four years. He entered the Army as veterinary surgeon so long ago as June, 1832; consequently he served his country, for he was still in the constabulary when he died, for fifty-four years. He joined the 10th Hussars, with which he remained for several years, and afterwards the 11th Hussars. With the latter regiment he went to the Crimea, remaining there during the whole of the campaign, and acting as Principal Veterinary Surgeon to the British Army in the East. He was present at the battles of the Alma, Balaklava, Inkerman, and Tchernaya, the affair of Bulganak, and the siege and fall of Sebastopol. For his services in the Crimea, he received the Crimean medal, with four clasps, the Turkish war medal, the Knighthood

of the Legion of Honour, and the Fifth Class of the Order of the Medjidie. In the year 1870 he retired from the army on half-pay, and was appointed Veterinary Surgeon to the Royal Irish Constabulary, with the rank of First Class County Inspector.

Though for many years he had made no contributions to veterinary literature, yet in his earlier years he gave to the profession some valuable papers, particularly one detailing a series of ingenious experiments on the expansion of the horse's foot, in which the views maintained by Coleman and Bracy Clark were demonstrated to be erroneous. He was also the inventor of the casting hopples now in use. Throughout his military career he conducted himself in the most exemplary manner, and won the confidence and friendship of all the officers with whom he served; while his genial disposition, large store of knowledge, and goodness of heart, endeared him to his professional colleagues, especially the younger members, to whom he was a counsellor and guide, affording them encouragement, stimulating them to exertion, and winning their lasting friendship and gratitude. A Dublin newspaper, alluding to the closing scene, says:

"The number of persons attending the funeral, which was one of the most imposing ever seen in Dublin, was sufficient proof that during his long service Mr. Gloag had endeared himself to all who came in contact with him, and both the military and constabulary branches united in paying the last tribute of respect to his memory. Shortly after nine o'clock the coffin containing the remains of the deceased was carried from his house on the shoulders of six sergeants of the constabulary troop, and by them borne to St. Paul's Church in King Street, some of the officers of the troop acting as pall-bearers. The coffin, which was of oak, and bore a breastplate on which was the name and age of the deceased, was preceded by the bands of the 16th Lancers and the Royal Irish Constabulary—the latter playing the Dead March in "Saul"—and a firing-party, sixty strong, from the former regiment, under command of Captain Sharman Crawford and Lieutenant Beaumont, whilst the street leading to the church was lined with the constabulary men, who numbered about 140. In the church, of which Mr. Gloag had been churchwarden for many years, the lesson for the day was read by the Rev. Mr. Johnston, and the Rev. Mr. Mahaffy, rector, delivered an impressive address. As the coffin was being removed from the church to the gun-carriage which was in waiting, the Dead March was played on the organ. The cortege having been formed, with the firing-party of the two bands in front, the chief mourners coming next, then the constabulary, and then the general mourners, a start was made, and Mount Jerome reached about 11 o'clock. Here the Rev. Mr. Mahaffy and Rev. Mr. Johnston again officiated, and as the coffin was placed in the earth, the usual three volleys of musketry were discharged, the band of the Lancers meantime playing a sad, dirge-like air, which was most effective. A very large number of magnificent wreaths were forwarded by the friends of Mr. Gloag, amongst the most beautiful being those from the corps to which he belonged."

The chief mourners were Dr. Gloag, Mr. W. A. Russell, A.V.D., Mr. George Partridge, and Mr. Robert Patchell.

Amongst those present were Mr. Reed, Inspector-General R.I.C.; Mr. Hurley, Private Secretary to the Inspector-General; Mr. Lyster Reed, Mr. George E. Newland, Commandant R.I.C.; Messrs. John Bodley, D.I.; Robert Carson, D.I.; James Murphy, D.I.; J. Tyson, D.I., Riding-master; —Williamson, D.I., Adjutant; Wm. Carter, D.I.; A. S. Heard, C.I.; S. A. W Waters, D.I.; Dr. Fleming, P.V.S. to the Forces, represented by the Inspecting Veterinary Surgeon in Ireland; Mr. James Frederick, Mr. James Daly, sen.; Mr. Daly, jun.; the Officers of the Army Veterinary Department in the Garrison, Mr. Van Maanen, bandmaster R.I.C.; Dr. Baird, R.I.C.; Surgeon S. J. Gordon, R.I.C.; W. A. Russell, Surgeon Hepburne, Surgeon Swan,

— Manly, Charles Steele, James Wilson, James Crozier, Dr. Powell, F. Gifford, Thomas Pearson, John H. Winder, Dr. Carte, J.P.; H. Sewell, W. B. Walters, E. B. Healy, J. W. Sewell, J. Kettle, M. Murphy, Joshua H. Nunn, Dr. William Z. Myles, Thomas M'Guinness, Rev. J. G. Swifte M'Neill, Professor Swifte M'Neill, — Devlin, James Murphy, Henry M. Winder, E. C. Saunders, W. A. Reeves, John J. Molony, Leonard H. Dobbyn, Francis Gibney, C. Molony, R. G. Duncan, F. F. Collins, J. D. Lambert, F.R.C.V.S.; E. T. Murray, J. T. Hurford, J. Hurford, jun.; W. Shackleton, Captain J. W. Power, Henry Corley, B.L.; Dr. Harrison, T. J. Robinson, Dr. H. Torney, D. Byrne, — Shelly, J. M. Crozier, V.S.; W. C. Joseph, M.R.C.V.S.; Robert G. Patchell, Robert J. Patchell, C. W. Hanlon.

A large body of police were on duty in Blackhall Street and its neighbourhood, under command of Inspector Gorman.

Mr. R. H. N. Holloway, M.R.C.V.S., retired Staff and Inspecting Veterinary Surgeon, Madras Army, died on August 7th. He entered the profession in 1850.

Notes and News.

OUTBREAK OF ANTHRAX IN LEICESTERSHIRE.—At a village (Arnesby) in the above county, some few miles from Leicester, reports *The Lancet*, there has been an outbreak on one farm of Splenic Apoplexy, which proved fatal to some eight or ten beasts. On the 31st July a carcase of one of these was sent to the Leicester market, and the man in charge of it scratched his hand with the bone thereof, and died in a week from a severe attack of Malignant Pustule. At least two other men have suffered severely, also from the disease, who had to do with the killing of the animals. The Veterinary Inspector stated at the inquest on the fatal case, though we can scarcely credit it, that he never condemned beasts suffering from Splenic Apoplexy, as he considered them fit for food if thoroughly cooked. Some of the carcases were, it appears, sent to the London meat market, but were not, it is stated, sold there as human food.

CONTAGIOUS DISEASES IN PRUSSIA.—The *Konigsberger Land und Forstwirthschaftliche Zeitung* says it has been proved that the province of Posen is, of all provinces in Prussia, the one most affected with epizoötics, and that dangerous contagious diseases amongst cattle and horses, and Rabies in dogs, seem to have taken such hold in the province that they cannot be exterminated. This is owing in a great measure, probably, to the close proximity of the Russian Empire, where sanitary and police matters are very slack. The *National Zeitung* advises a sharper control and supervision of the precautionary measures now in force amongst the veterinary police officers in Prussia.

DOGS IN LONDON.—Sir Charles Warren, in his orders issued from the Metropolitan Police Office, dated Wednesday, August 11th, states that "the total number of dogs not under control taken by the police to the Dogs' Home during the month is 2,898. Of these 52 were killed in the streets as rabid, and one developed Rabies at the Dogs' Home There were 587 summonses taken out against owners of dogs not under control; of these 338 have been heard, resulting in 320 convictions and 18 dismissals. The magistrates at petty sessions at Barnet, Uxbridge, Edgware, and Kingston borough and district, have decided that dogs under control should be muzzled or led. Of the 52 dogs killed in the streets as being rabid or savage, the diseases are as follows:—Number afflicted with Rabies, 15; bitten by a mad dog, 1; not examined (taken by owners who refused to have carcases examined), 3; afflicted with Epilepsy, 20; afflicted with Fits, 2; afflicted with Convulsions, 6; afflicted with Acute Peritonitis, 1; ferocious or savage, 4; total, 52; rabid at Dogs' Home, 1—total, 53. Sixty-five persons are known to have been bitten by dogs during the month—40 civilians and 16 police-constables by dogs not known to have been mad, and 6 civilians and 3 police-constables by

dogs known to have been mad. One case of Hydrophobia has been reported as having occurred in London during the month.

DIPHTHERIA.—It appears there has been a great spread of Diphtheria in fowls lately, and the *Konigsberger Land und Forstwirthschaftliche Zeitung* maintains that human health is endangered thereby. Although the fungus may be destroyed when the fowl is roasted or boiled, persons preparing it or killing it certainly run a certain amount of danger of contracting the disease. At Breslau it is compulsory to have all the fowls exposed for sale thoroughly examined first, and disinfecting measures are taken with the cages, coops, or henhouses of suspicious birds.

RABIES IN CAMELS.—Several cases of Rabies are reported to have occurred among camels at Hezeilat (Algiers.) It is stated that a few months ago two camels were affected with the disease, and died in thirty-six hours without presenting any trace of a bite. It is supposed that the disease was imported by a rabid horse, which had during the night joined the herd. The propagation of the disease is attributed to the saliva which the rabid animals left on the pasturage, which saliva was probably absorbed by the sores in the mouth to which camels are frequently subject. The military authorities have interdicted, for three months, grazing on the pasturage in which the contaminated herds were enclosed.

THE FILARIA IMMITIS.—In an interesting paper which appears in the New York *Medical News*, on "Filaria Sanguinis Hominis in the United States," the writer observes :—A few remarks concerning the filaria immitis will not, I hope, be found out of place. This name was given to it by Dr. Leidy, who described it from a specimen sent to him from South Carolina, I believe. This parasite infests the dog. I am told by Benjamin McInnes, V.S. Edin., that it is quite common in this city. The adult male and female of this nematode inhabit the venous side of the heart. Dr. McInnes has a specimen, consisting of fifty-two of these worms, which he removed from one heart. They measure from ten to thirteen or fourteen inches in length. The doctor has now a bitch that has been infested for some years. She has just had a litter of pups, which were born without filaria, though three out of nine have died unaccountably. A drop of blood taken from this bitch at any time is sure to contain one or more embryo filariæ. This embryo very much resembles that of the filaria sanguinis hominis, but I find that the former appears to be of firmer consistency, and is more vigorous and active in its movements. It ploughs its way, headforemost always, through thick fields of red corpuscles. To follow one of them it is necessary to keep the stage of the microscope in constant motion. The head is less tapering than that of the human hæmatozoon, a condition which I attribute to the rapid forward movement. The human parasite, on the other hand, appears to get easily entangled with the fibrin and red corpuscles, and though wriggling actively, seems to do so aimlessly, and is seldom able to move out of the field of a one-fifth inch objective.

Correspondence.

MANGE AND TETANUS.

DEAR SIR,—In your issue for June, 1886 (p. 470), under the above heading, I am anxious, in reply, to express my regret for unintentionally hurting the feelings of Major-General Brown in a paper by me, namely, "Practical Observations on Tetanus in India," which appeared in your Journal for June, 1884. I must ask the General to consider the following extract from the said paper *only* as referring to him personally :—"Colonel Ryves' friend, Colonel Brown, is a firm believer in homœopathic medicine, which really means leaving cases to nature, but his 'Nux Vomica by Olfaction' would somewhat inter-

fere with the necessary quietude." I am sure there can be nothing uncomplimentary in this statement. I must further request not to be included amongst those "veterinary surgeons who treat with scorn suggestions made by amateurs." At the same time, I was not aware such a "fashion" existed. I am always only too pleased to hear suggestions from amateurs (white or black) and note them down. If not trespassing too much, I will quote my last note from an amateur :—"Try cocoa-nut oil for Prurigo internally." A few days ago a gentleman showed me round his stables, and pointed out two animals which, he stated, a short time ago were covered with Prurigo, and that he gave some cocoanut oil mixed up in the food for some days, when the itchiness ceased, the hair grew again, and they have now nice clean coats. This treatment, perhaps, does not read as a likely cure for this troublesome skin disease, but I am going to try it. In conclusion, my supposed conceit, which has deprived the profession of some invaluable remedies (gratis and free for nothing) for two of the most obstinate disorders, would allow me to pay a share of the fee claimed for the secret, or to purchase and use the medicines in question should they become patented. In the latter case I might have the satisfaction of knowing that my "conceited remarks" were the cause of the General realizing a nice little fortune, in which I should have no tangible share.

Kamptee, July 4th, 1886. GERALD H. FENTON, A.V.D.

A QUESTIONABLE MOTION.

SIR,—Professor Axe has given notice in the Council of a motion to the following effect :—

"That any members of the Royal College of Veterinary Surgeons having held the office of President or Vice-President of the College for two years shall not be eligible for re-election, in the case of the President, until the expiration of ten years, and in the case of the Vice-President, until the expiration of five years, and that no member of the profession shall be eligible for either appointment, unless he has been at least ten years in active practice."

There is no doubt that on two recent occasions the Council was unfortunate to make mistakes. It was too apathetic about our representation upon the Pasteur Commission, and more recently it was a little too impetuous in granting Fellowship degrees.

These errors were due to an intense yearning on the part of the Council to get us united about the Fellowship, which drove everything else from its mind.

Whether Professor Axe's motion is connected with these recent events or with others more recent still, I am not in a position to state, nor does it matter to us why Professor Axe came forward with his notice. As regards the first part of his notice we can deal with results. Has the present system of electing officers in Council answered? I think it has. Is the profession satisfied? I think so. Then why change? Because there may be gentlemen waiting their turn of the chair, whose turn is delayed by re-electing officers who have already served. That is the only answer I can think of, but I am not sure that it is a fair one. I imagine that as we have elected about thirty gentlemen to represent us on the Council, we ought to feel sufficient confidence in them to desire they shall not be restricted in their selection of officers in any way. The profession, I take it, desires to see the most competent men at its head, irrespective of the number of times they have been there before. We really cannot afford in our present unsettled state to follow the lead of any others for merely sentimental reasons.

The Presidents and Vice-Presidents of the Royal College of Veterinary Surgeons must be called to the chair, not because they are this or that, nor because it is their turn, but simply because they are the very best men of all others to lead us onwards.

That these views are shared by leading members of the Council seems

amply proved by the fact that some of them refused to come forward as candidates for the Presidentship. All honour to them for thus sacrificing themselves to the common good.

It appears, therefore, not impossible that should Professor Axe's motion pass, greater benefit will accrue to individuals than to the profession generally.

The second part of the motion smells rather unpleasantly of trades-unionism. If any of the members of Council or Vice-Presidents were of less than ten years' practice, one would be justified in surmising that Professor Axe wishes to prevent errors such as have been quoted by introducing an age clause. I find, however, that by far the majority, if not the whole of the Council, is composed of gentlemen of more than twenty years' practice. If length of practice, therefore, was the cause of recent backslidings, these errors were more closely connected with the senility than the youth of the Council. Personally, I do not think age had anything to do with them. It is more probable that the Council was so anxious to meet some gentlemen more than halfway to the Fellowship that it forgot all other considerations and tripped up. Doubtless those gentlemen will appreciate the efforts of the Council, although they miscarried to a certain extent.

Your ordinary reader will have some difficulty in tracing the origin of the second part of the motion. From what I know of him, Professor Axe is too large minded to have any private motives, and, failing them, I come to the conclusion that he is alarmed at the recent appointment of a young man to lead the destinies of a neighbouring assembly, and, being determined that no veterinary Lord Randolph shall disturb the slumbers of Red Lion Square, has taken time by the forelock.

Whatever Professor Axe's reasons are, no one will doubt they are disinterested; at the same time, his notice is no compliment to the perspicacity of his brother councillors, for he is inciting them to censure in an indirect way one of their recent decisions, and thereby to stultify themselves. "SACK."

Several communications as well as reviews of books are held over until next month.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from Professor McCall, Glasgow; J. Donald, Wigton; G. A. Banham, Cambridge; J. B. Gresswell, Louth; R. H. Dyer, Limerick; "Sack"; R. S. Barcham, Norfolk; E. Price, Birmingham; A. Broad, London, H. Kidd, Hungerford; G. Gresswell, Louth; R. Rutherford, Edinburgh; C. Cunningham, Slateford; T. Raymond, Woolwich; R. W. Burke, A.V.D., Cawnpore; G. H. Fenton, A.V.D., Kamptee; J. S. Hurndall, Liverpool; M. G. Blanchard, Hamilton, Canada.

BOOKS AND PAMPHLETS: Biennial Report of the Hawaiian Minister of the Interior; *J. B. and A. Gresswell*, The Equine Hospital Prescriber; *Dr. C. James*, La Rage; *J. and R. W. Burke*, Veterinary Surgical Pathology and Practical Medicine; *R. W. Burke*, Bursati or Cancer.

JOURNALS, ETC.: *Wochenschrift für Thierheilkunde und Viehzucht; Der Thierarzt; Journal of National Agricultural Society of Victoria; Twelfth Annual Announcement of the American Veterinary College; Chicago Live Stock Journal; American Veterinary Review; Quarterly Journal of Veterinary Science in India; Journal de Médecine de Paris; Recueil de Médecine Vétérinaire; Revista Popular de la Exposicion Rural Internacional; Journal de Médecine Vétérinaire et de Zootechnie; Annales de Médecine Vétérinaire; Repertorium der Thierheilkunde; Medical News; Hufschmied; Lancet; Live Stock Journal; Mark Lane Express; British Medical Journal; Revue Vétérinaire; Edinburgh Medical Journal.*

NEWSPAPERS: *Scotsman; Scottish News; Glasgow Herald; Dublin Daily Express; Irish Times; Madras Mail; Norwich Mercury; Canadian Gazette; Daily Nebraska State Journal; Melbourne Weekly Times; Kentish Gazette.*